Volume 72 No 10
October 2004

Amateur Radio

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WIRELESS INSTITUTE OF AUSTRALIA

The magazine for AUSTRALIAN amateurs

featuring

The VK5DJ repeater controller
John Drew VK5DJ

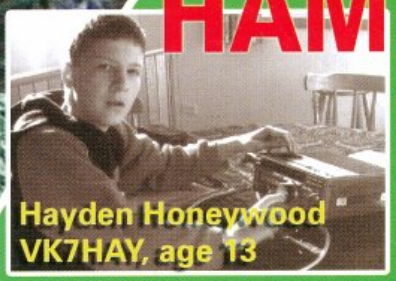
A CW transceiver for 40 metre
Joe Rotenberg VK3BBN

The 204BA, a 4-element 20 metre beam *PLUS*
Bob Slutzkin VK3SK

Fixing-up old broadcast gang capacitors
Drew Diamond VK3XU

New voices on the air

How I became a HAM



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GENERAL

TECHNICAL

COLUMNS

Our Cover this month

Radio activities in South Australia at JOTA 2003

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the National Office on receipt of a stamped self-addressed envelope.

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A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Editorial comment

Colwyn Low VK5UE

Passing the baton

October, and Jamboree On The Air (JOTA), is here again. Please help to make JOTA a success again.

The inside back cover (IBC) in this issue shows us something of amateur radio in a developing country that is short on resources. Donations of equipment are very welcome and much is needed. Sam Voron, currently, 60A, in addition to his normal job activities, promotes amateur radio wherever his aid work takes him. You can contact him on his e-mail svoron@hotmail.com.

The National WIA is beginning to settle down and the former Divisions are sorting out how the current services will be provided in the future and what sort of umbrella structure the clubs in the various states need to ensure the smooth operation of amateur radio communications infrastructure. The interim arrangements do all seem to be satisfactory.

With Amateur Radio magazine (AR) now being sold on the newsstands I think it would be a good thing if we carried an information section where books on basic electronics and radio communication are advertised and where courses of instruction for amateur radio licences are advertised. If all you have is a copy of the present AR, you may need to be shown where to obtain some additional information. Look at page 24 "How I became a Ham". It seems to me here is a new ham who needs some very basic assistance.

The Remembrance Day Contest, usually referred to as "the RD", was well supported and, hopefully, continued to deserve the title of "the Friendly Contest". The address given by General Peter Cosgrove AC, MC, Chief of the Defence Force, is on page 27 and some of the comments reiterate the views expressed in the letter on page 22. The need to develop interest in things electronic, and to provide educational paths to gain qualifications to gain employment in the electronics industry, are important to the country as a whole. We cannot continue to rely on the older generations to develop the basic support structure of our community in the future. Electronics and radio communication are one on the major foundation stones of modern society.

The activities we carry out as amateurs help us develop an "Amateur Radio Service" which can help the communities we live in, in both emergencies and in social activities. WICEN, the Wireless Institute Civil Emergency Network, helped civil authority in Cyclone Tracey, the Newcastle Earthquake and in many Bush Fire emergencies. It also helps Horse Enduros, Canoe Marathons, Car Rallies and Fun Runs. So help prepare by participating in some way in an operational field day or a contest. Did you - will you - be taking part in the Oceania DX Contest, October 2/3 SSB, 9/10 CW?

We cannot continue to rely on the older generations to develop the basic support structure of our community in the future. Electronics and radio communication are one on the major foundation stones of modern society

Well, that is enough to think about for another month. I must try and find the time to get my VHF/UHF portable gear all working for the VHF/UHF Field Day which is to be held on the weekend of **NOVEMBER 6/7th**. Please note the date, as the following weekend had been a possibility

73 Colwyn VK5UE

Michael Owen VK3KI

The WIA position on Broadband over Power Line (BPL)

This month's WIA Comment is written with Phil Wait, VK2DKN, WIA director responsible for BPL matters.

The Wireless Institute of Australia is very concerned about the suggestion that Broadband over Power Line (BPL) should be introduced in Australia.

Many national amateur radio societies, and their regional organisations have already expressed a similar concern.

BPL is a form of power line carrier technology (PLC) using existing power line infrastructure to deliver broadband services to homes and business.

The proponents of BPL argue that the technology provides the community with a cheaper means of access to broadband than existing methods, no doubt attractive to governments if it is economic and does increase competition. However, the WIA is far from convinced that the technology is the best option at this time and is certainly convinced that it comes at a considerable, and unacceptable cost.

The HF radio spectrum is unique in that it provides long distance communications systems without the need for satellite or cable infrastructure. It provides safety and comfort to those travelling and working in the most remote parts of this sparsely populated country or on the high seas. It forms the backup network for defence communications and cannot be `taken out' in times of war.

The evidence currently available on the interference effects of BPL suggests that a wide area BPL rollout will be a disaster for HF radio communications, and therefore our hobby. The American Radio Relay League (ARRL) has clearly demonstrated that BPL technology could render HF bands useless in many urban areas.

Importantly, it seems beyond argument that the current state of BPL technology could not be widely effective in providing improved broadband access to rural and outback Australia and therefore can do little to address the inequity of access to broadband services for the bush. On the other hand, emerging broadband wireless systems such as Wi-Max, and satellite systems will provide the predominant viable alternatives.

Accordingly, any BPL service could only be delivered effectively to those already well served by existing broadband networks in cities, or to localised areas around rural towns, and would do little to improve broadband access for rural Australia.

BPL systems are built on 1960's cable TV architecture where the available bandwidth is diluted by all users on the BPL feed cable. Many argue that BPL will not provide sufficient bandwidth (especially at peak access times) for tomorrow's applications, such as video on demand. They argue that if BPL is adopted, Australia could be left with an `artefact technology' with an inadequate ability to serve the consumers ever-increasing 'need for speed'.

Power lines make very poor high speed data transmission lines, are full of discontinuities, and are notorious radiators of electromagnetic noise. The interference potential from BPL to all users of the HF radio spectrum is very high and extremely widespread. This has been clearly demonstrated by ARRL testing of trial BPL systems operating in the U.S., as well as testing in many other countries including Japan and in Europe.

The WIA is far from convinced that the technology is the best option at this time and is certainly convinced that it comes at a considerable, and unacceptable cost

It has been demonstrated that laboratory measurements of radiated emissions (interference), and also computer-modelling schemes, do not correlate well to real world measurements. Small trial systems do not properly demonstrate the effect of a wide-area roll out. The WIA believes that one of the current problems associated with BPL is that trials on a limited basis are not good indicators, and even though some trial results have already been problematic for BPL, the full negative effects of BPL technology have probably not been seen with such trials.

Interference is a two-way street. A BPL network is also susceptible to interference and service disruption from nearby radio transmitters or other sources of electromagnetic noise such as electrical appliances, electric trains and corona discharge. Denial of Service attacks are also a concern, as many believe that a denial of service attack could be relatively easy to achieve on a localised part of a BPL network.

Extensive backup systems would be necessary, especially if BPL was used for emergency services, and there seems little point in using BPL when the backup systems (fibre, wireless etc.) could be vastly superior in security, reliability and performance.

It may well be that the 'window of opportunity' for the deployment of BPL systems is quite narrow as other more suitable and 'safer' technologies such as broadband wireless (Wi-Max) emerge and which may prove to be more effective and less costly. A deep fibre network where optical fibre is run down the street on the existing power poles to broadband wireless feeds into each building could be a more effective and robust technology. Trials in the United States show new broadband radio technologies such as Wi-max are capable of providing high-speed Internet access

continued on page 19

The VK5DJ repeater controller

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There are a number of repeater controllers available on the market, most from the USA although from time to time Australian designs have appeared and been used around the country. Dozens of amateurs must have designed units for their local repeater and not published their designs.

The writer has been experimenting with controllers since 1971. The first foray was the remote control board for VK5RAD (Adelaide) in 1971, and in 1976 came the entire works for VK5RMN (Port Pirie) built on plug-in matrix boards. Later the board etching skills improved for the circuitry of voice repeater VK5RMG (Mount Gambier) and the digipeater VK5RPM (Millicent). The controllers had many NE555s, NE567s, TTL and CMOS gates and diode matrices for callsigns. The 1983 version for VK5RMG had 6 boards in total. The controllers were reliable but they did take a lot of time and effort to design and build. They also took up a lot of space.

Microprocessors have been around for a long time and many people have successfully used them in controller circuits. The NHRC-4 controller from the USA is a particularly successful design. The South East Radio Group (SERG) purchased two boards and the essential ICs as a kit and these were assembled and used to link the Naracoorte and Mount Gambier Repeaters together in 1999. A UHF link provides the essential communication. They work well but they are relatively expensive.

When the concept of a gateway to Kingston was suggested at a SERG meeting the author thought "I can do that" and started playing with the 16F84A and an excellent BASIC compiler from Crownhill Associates (UK). The language has many of the qualities of Pascal and is exceptionally powerful. PICBasic Plus requires the declaration of variables in advance and makes strong use of sub routines rather than string code etc. It has something in common with the old assembler language but with a very friendly and powerful command set. It compiles some very tight code for the PICs. Check out the PICBasic forum at www.picbasic.org if you want more information or want to play with the free LITE version. The programmer board used is the P16Pro40 Programmer – the author's kit came from Oatley Electronics and uses PICALLW software to do the programming. The latter is free if you stick to the 16F84.

These little PIC Microcontrollers are very powerful. The common 16F84 has flash memory space for 1024 commands (14 bits in length), it has 64 bytes of electrically erasable data storage (handy for callsigns and timer delays) and 68 bytes of RAM for storing variables. It has an 8-bit bi-directional port and a 5-bit bi-directional port. That's 13 connections to do clever things with. It all fits in an 18-pin DIL package. Nifty! That's enough computer talk, now on to the controller.

Firstly it was necessary to be sure of the requirements. It had to be capable of running a traditional repeater with remote control capability, provide all necessary timers and tone generation, be capable of supporting a gateway or link and, with increasing interference problems in the spectrum, the capacity for CTCSS controlled transmit. The ability to change callsign and timers by remote control was considered desirable. All of this to be achieved with a minimum of components built on a single board within a small box.

The unit to be described is Version 3. The two previous versions run the

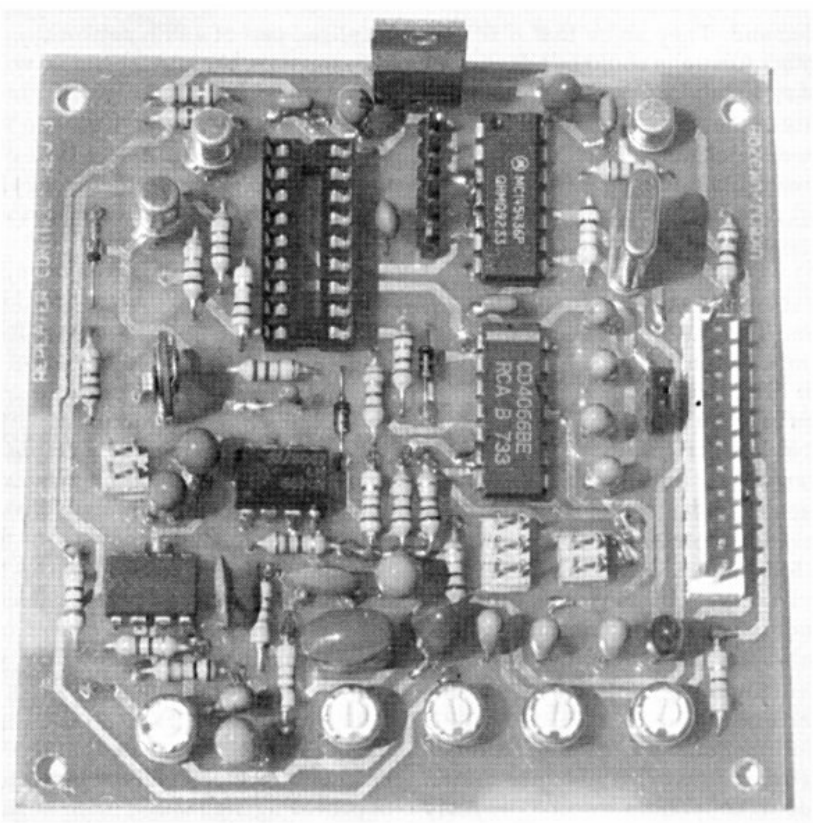


Photo 1. Circuit board

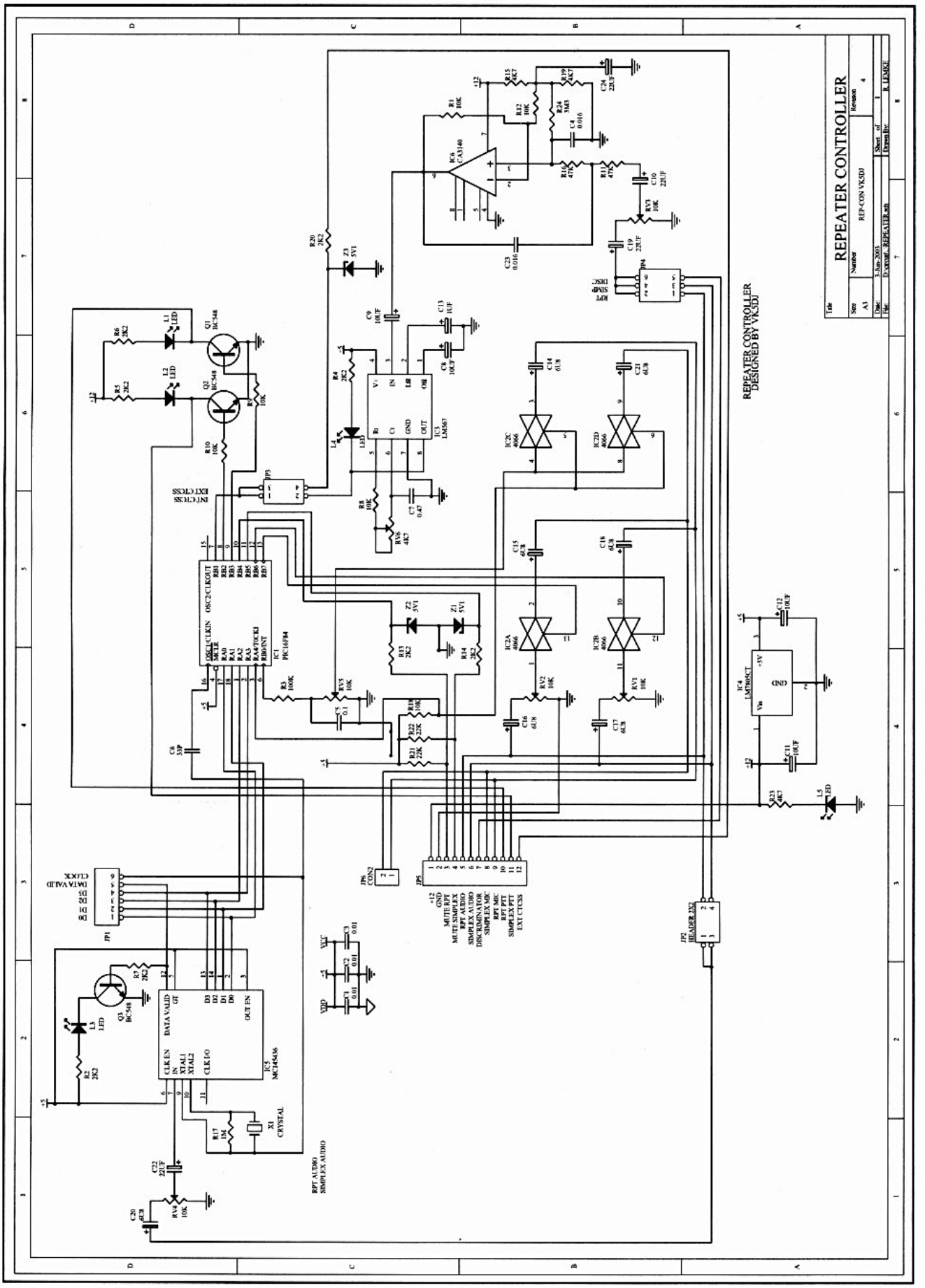


Figure 1. Schematic diagram

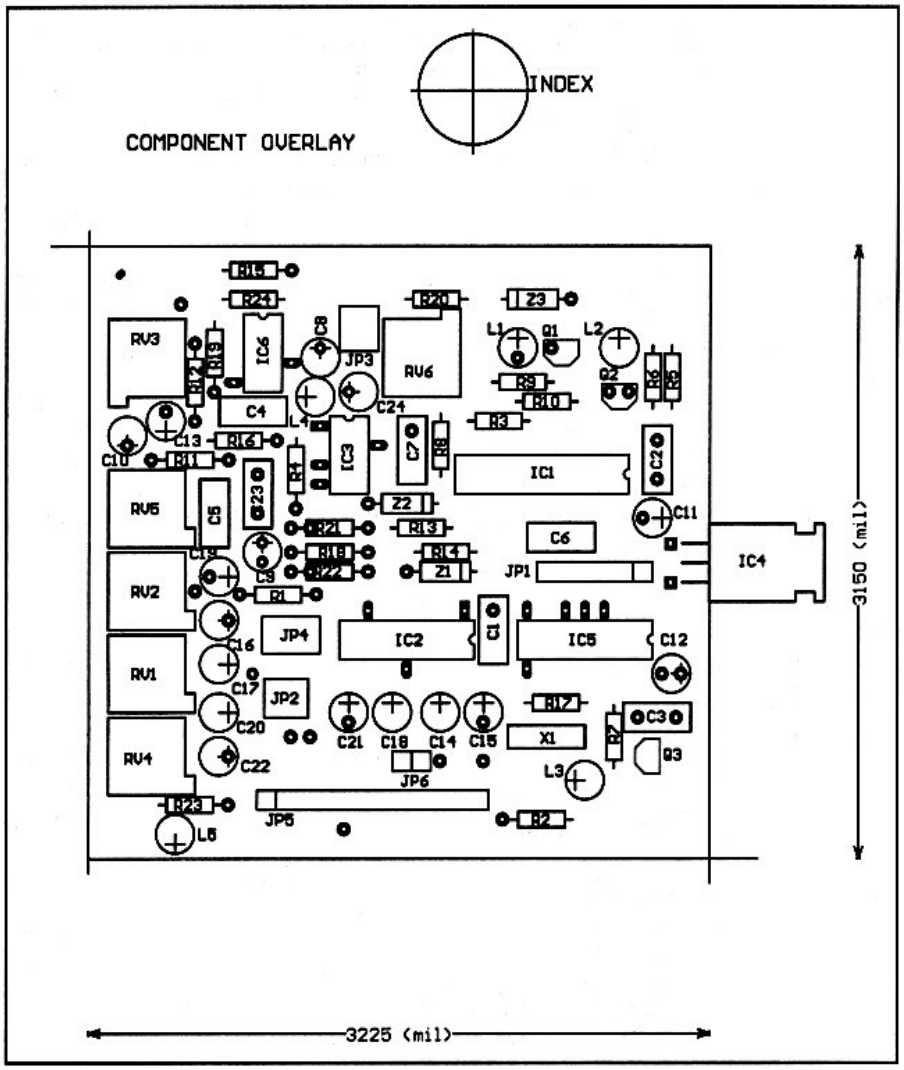


Figure 2

Kingston Gateway and the 70 cm Mt Gambier Repeater with 29 MHz gateway. Version 1 did not include a CTCSS or DTMF decode while Version 2 did not include a low pass filter for the CTCSS. Version 3 represents the gradual evolution of the controller and tidying of some aspects of the circuit. For example it was found that it was not necessary to amplify the audio to the microphone inputs, receivers seem to have plenty of line out audio.

The controller is designed around the 16F84A PIC, a MC145436 IC for DTMF control, a combination of a CA3140 op amp operating as a second order low pass filter and a NE567 to detect CTCSS tones while a 4066 CMOS switch controls audio. A LM7805 provides regulated 5 volt to the ICs that require it.

The choice of a NE567 to decode CTCSS is a practical one as the author has a number on hand, they are cheap and they work OK. There are a small number of specially designed CTCSS chips on the market. They are quite expensive and couldn't be located in Australia. If a reader is interested in using a proprietary CTCSS chip then a small outboard circuit could be developed. The controller board can interface to an external decoder (see jumper JP3 and pin 12 of the external connector). This latter facility was used for the VK5ROH Version 2 board, as a commercial CTCSS decoder was available courtesy of Col VK5DK.

The PIC does all the hard work including the generation of tones, timing, callsign, interpretation of remote controls and of course switching the output pins in accordance with instructions from the receiver mute inputs.

Using protoboard I took myself through the 'flashing a LED' testing programs on to the main features of a controller. LEDS and switches grew in 3 dimensions but the prototype served its purpose and enabled me to build Version 1, now in use at the Kingston Gateway. I used a Dalo pen to create the tracks and etched a board using my home made, windscreen wiper agitated, ferric chloride bath.

Version 2 of the board introduced the CTCSS and the DTMF on board. The DTMF worked fine but the CTCSS tended to drop in and out with speech. Those of you familiar with CTCSS will know that the added tone is low in level and because of the response of receiver audio pass bands all but disappears if you try to decode it at the top of the volume control. Audio must be taken very early in the audio circuitry, preferably at or shortly after the discriminator. Version 2 badly needed a low pass filter to improve performance, hence the redesign for Version 3.

Working quietly behind the scenes for Versions 2 and 3 was Russell Lemke VK3ZQB who kindly turned my hand drawn circuits into very nice circuits, boards and parts lists. The project would not be as successful as it is without Russell's skill with a drafting program and photographic production of boards. Thanks Russell.

How does it work?

The controller provides all control functions required for a repeater, linked repeater or gateway operation. Typical uses include:

1) A general repeater controller – duplexed single receiver and single transmitter using a 4-6 cavity system to connect to one antenna. Alternatively separate antenna systems with perhaps a single cavity in TX and RX to reduce desense.
2) A duplexed repeater with a gateway eg a UHF repeater with a 29 MHz gateway
3) A duplexed 2 m repeater linked via UHF to a remote repeater system
4) A simplex gateway connected to a simplex transceiver that remotely accesses a repeater system (range extender concept).

Features:

- Two mute inputs (i.e. a receiver A and receiver B)
- Two PTT outputs (LED indicators on board)
- Onboard DTMF decoder
- Onboard CTCSS decoder (to meet

licensing conditions or remove interference)
- Timeout timer
- Callsign generator with timer
- Tail with mode pips
- All tones generated on board
- Remote inhibit of timer
- Remote inhibit of primary repeater
- Remote inhibit of gateway (or link)
- Remote callsign configuration (including call itself)
- Remote adjustment of callsign delay
- Remote adjustment of timeout period
- Uses a PIC 16F84A for logic control, timing and tone generation.
- Audio switched with a 4066 quad solid state switch
- CTCSS decoding with a NE567, low pass filtering with a CA3140
- DTMF decoding with a MC145436 chip
- All components are readily available in Australia

The PIC (a 16F84A) is provided in programmed form according to user requirements. If you want a copy of the source code and/or the compiled code it is available free from VK5DJ for amateur use (see website http://vk5dj.mountgambier.org). Using the supplied hex file constructors can program their own PIC. The author will provide, on request, hex files for other combinations eg mute active high.

Connection to the real world is through a 12 pin plug mounted on the board

Main connector

Pin	Description
1	+12 V in (approx 10 mA)
2	DC common ground
3	Mute input from repeater receiver
4	Mute input from gateway or link transceiver
5	Repeater audio in (receiver approx 100 mV)
6	Gateway/link audio in (receiver approx 100 mV)
7	Discriminator of repeater receiver (for CTCSS)
8	Gateway/link audio out of board (microphone)
9	Repeater audio out of board (microphone)
10	Repeater PTT
11	Simplex PTT
12	External CTCSS detect input to board

Detailed description of main interconnector JP4

Pin 1 is the unregulated supply voltage to the board, nominally +12 volt but should lie between the limits of 8-14 volt for reliable operation.

Pin 2 is the common ground for power supply, logical inputs and audio lines.

Pin 3 the repeater receiver mute input is generally programmed for 0 V when a signal is received (ie active) and +5 to 15 V when the receiver is quiet. The line is clamped on the board with a 5.6 V zener. Note that the line is held to either +supply line or 0 V via a 22k resistor mounted on the board to ensure that if a receiver is not connected the input line has a clear logic level. When constructing the board the pull up resistor OR the pull down resistor (R21) is installed depending on the mute state available from the receiver in use and the appropriate programming of the PIC.

If active high from mute then install a pull down resistor (reprogram PIC for active high). If active low from mute then install a pull up resistor.

Pin 4 the gateway (or link) transceiver mute input. See notes for pin 3 but R22.

Pin 5 is the repeater receiver audio in. A capacitor is included on the input in case this line has superimposed DC. Audio levels should be at least 100 mV. Pot RV2 controls the level. The top of the volume control in the receiver is an ideal source although some transceivers have an output on a connector for this purpose. It doesn't matter if the audio is not muted as the board provides this function.

Pin 6 is the gateway (or link) receiver audio in. See notes for Pin 5 but pot RV1 controls level.

Pin 7 is audio from the discriminator of the repeater receiver (or the receiver being used for CTCSS input). The audio must be taken at this early point to obtain sufficient CTCSS tone as these low frequencies are both low in deviation and strongly attenuated in the remainder of the receiver chain. Commercial CTCSS decoders use the discriminator or access a low pass filter (eg the Simoco PRF15-20 units). On this board I require separate audio in from the receivers and this comes in on pins 5 and 6.

Pin 8 is the audio out of the board to the gateway or link microphone. The level is adjustable and depends on the settings of RV2 (received audio) and RV5 (tone outputs for beeps and call sign)

In standard repeater/gateway/link use both pins 8 and 9 are jumpered together on board (JP6). In the case of an on air cross-linking gateway (e.g. a UHF gateway into a remote 2 m repeater via a simplex connection) JP6 is unjumpered.

Pin 9 is the audio out of the board to the main repeater microphone. Level depends on RV2 and RV5 when the repeater receiver is in use and RV1 and RV5 when the gateway/link is in use. See Pin 8 notes re JP6 use.

Pin 10 is the repeater PTT. It assumes that 0 V is active. The transistor could sink 20-50 mA but a relay should not be switched, as there is no protection from transients. The pin sits at +supply volt.

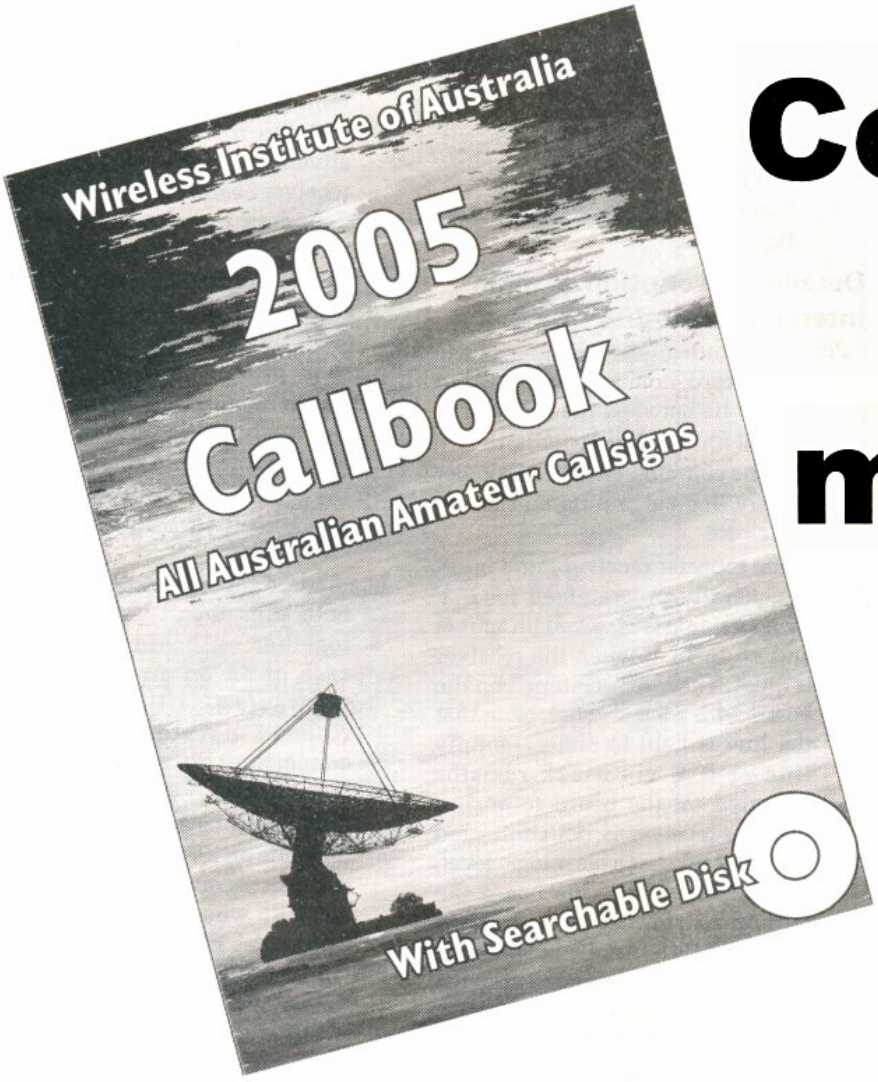
Pin 11 is the simplex PTT. See notes for pin 10.

Pin 12 is the output of an external CTCSS board. The pin expects an active high (5 to 15 volt). This is zener protected on board to 5.1 V. Jumper JP3 provides for either external CTCSS or internal CTCSS. If the internal CTCSS is not required do not install parts for IC3 (NE567 tone decoder) and IC6 (CA3140 op amp low pass filter).

Input

Mute inputs are available at pins 3 and 4 of the main connector. Repeater input overrides the gateway input. On lowering of the mute (received signal) the timer begins. On raising of both mute pins the timer is reset.

On timeout the board sends 'TO' and



Coming this month

All Australian Callsigns

Plus great detail about

The new WIA, Amateur Radio Clubs, Wicen, ALARA, AMSAT, ARDF, Band Plans, Beacons, Broadcast Stations, The ACA, QSLs, Great Circles, Maidenhead, DXCC, Packet Radio, Repeaters and more.

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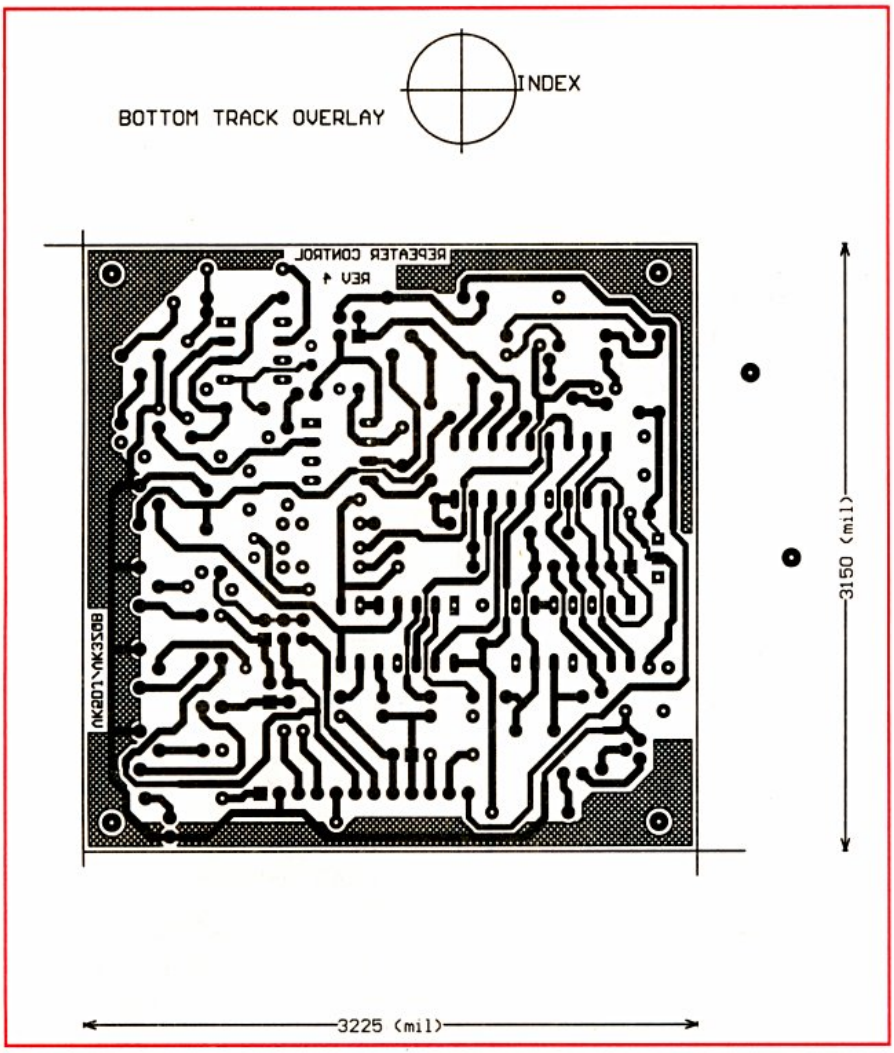

Figure 3a

LABEL ON DTMF PAD	NUMBER SENT	NUMBER received by software
1	Binary 0001 Decimal 1	Hex 1
2	Binary 0010 Decimal 2	Hex 2
3	Binary 0011 Decimal 3	Hex 3
4	Binary 0100 Decimal 4	Hex 4
5	Binary 0101 Decimal 5	Hex 5
6	Binary 0110 Decimal 6	Hex 6
7	Binary 0111 Decimal 7	Hex 7
8	Binary 1000 Decimal 8	Hex 8
9	Binary 1001 Decimal 9	Hex 9
0	Binary 1010 Decimal 10	Hex 0
*	Binary 1011 Decimal 11	Hex B
#	Binary 1100 Decimal 12	Hex C
A	Binary 1101 Decimal 13	Hex D
B	Binary 1110 Decimal 14	Hex E
C	Binary 1111 Decimal 15	Hex F
D	Binary 0000 Decimal 0	Unused

Translation Table

shuts down the PTT and audio of both transmitters. When both mutes are high the transmitter provides a tail and sends another 'TO'. The device is again ready for use. (See table)

The PIC Microcontroller

The mutes from the primary and secondary receivers are applied to Ports B.4 and B.5 of the microcontroller. The voltage is clamped to no more than 5 volt by the zeners to protect the input of the 16F84 from excessive voltage.

A zero on a mute indicates that a signal is being received. The mutes are continually polled by the microcontroller at approximately 20 msec intervals. Once a mute is open on Port B4 or B.5, the appropriate PTT pin is lowered on Port B.3 or B.2 and

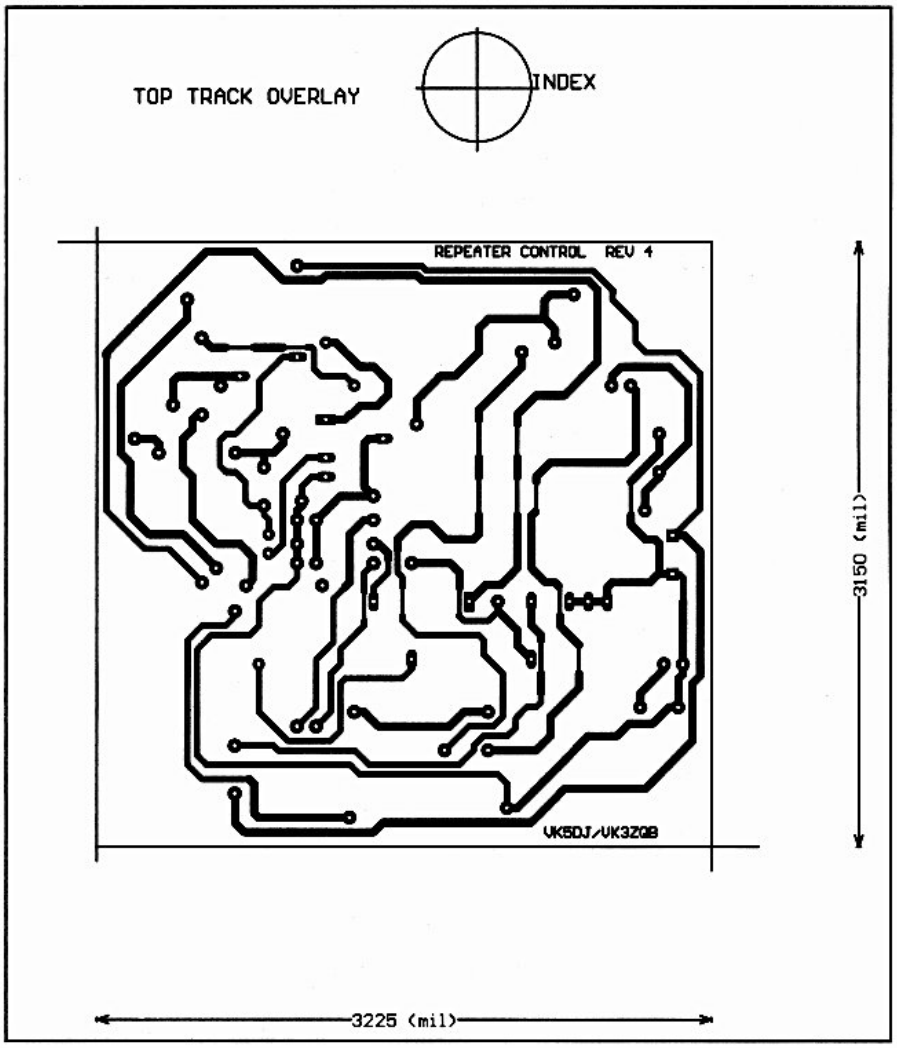

Figure 3b

at the same time the appropriate audio is switched on through Port B.7 or B.6. The timeout timer starts counting.

The duplex repeater always has priority.

When a mute goes high (receiver mute closes) the 16F84 checks to see if a callsign is due, if so it sends a callsign, if not it sends a tail and if appropriate a beep (or two or three – see later). The timeout timer resets to zero. The callsign timer resets if a callsign was sent otherwise it keeps counting. The delays for the callsign and the timeout timer may be remotely changed.

If a mute stays on for a longer period than allowed by the timeout value the audio is shut down, a 'TO' is sent in Morse code (Port A.4 goes high to turn on the audio switch), then the PTT is taken high (Port B.3 and Port B.2) and everything shuts down. When the mute finally goes high this frees the system and a further 'TO' is sent in Morse and the repeater/gateway/link is again available.

The DTMF controller system works in the following way.

A 145436-decoder chip has an oscillator running at 3.58 MHz. This frequency is coupled to the PIC and so provides clock signals to both the decoder and the chip. DTMF tones are applied to the input pin of the chip through JP2. The jumper on JP2 determines which receiver passes on the DTMF tones. On receiving a valid tone the output pins are sensed by the PIC through input ports RA0,1,2,3.

A three-digit address code is sent by DTMF and received on a receiver. For the sake of this document the address sequence will be 987. The address is followed by the control byte and possibly some data.

1 inhibits the main transmitter
2 inhibits the gateway/link
3 cancels the main timer (useful for the WIA broadcast)
4 requires CTCSS input to enable main transmitter (may be programmed to require CTCSS for gateway to meet limitations of some licences.)
5 changes callsign (see later for notes)
6 change callsign delay (units about 18 sec, HEX 10 gives about 5 min)
7 change timeout delay (units about 18 secs, HEX 0A but use HEX 0B - see later note re 0A) gives about 3 min
8 resets controls 1,2,3,4 to default, that is, timer active, gateway on, main TX on, no CTCSS required for main TX)

Example: If the address was 987 then a control sequence of DTMF '9873' will inhibit the main timer. When the carrier is dropped an 'OK' is sent in Morse if the command was successful. The tail will now have two beeps.

A DTMF sequence of 9878 will re-enable the timer.

Due to the nature of a DTMF touch tone pad the numerals sent by the pad do not quite align with their value (To complicate things I ran out of ports on the PIC and therefore couldn't decode the received tone enable pin, this limited access to 4 bits of data). I needed a zero more than I needed a 10 (HEX A) so I have internally translated the keyboard 0 (actually a 10) to a real 0 and thereby lost HEX A. Because of this the other digits are displaced so you need to use the translation table (see page 9). This means that when you need the HEX character in column 3 you must push the button in column 1. Messy, but you won't need to use remote changes very often. In fact after setting up you may never need to use them again.

If you only have a 12 digit DTMF keyboard you should be able to remote control quite satisfactorily. The author suggests using either 1# or 20 for the value of the dah depending on how you like the sound of dahs. A 1* meets the dah=3 dits definition perfectly but most amateurs prefer a dah a little longer than

the recommended 3 times the length of a dit. You may think otherwise.

Changing the callsign.

This is FUN! The PIC program works by reading the delays you enter in EEPROM memory via command 5. (eg send address 987 and the 5)

Dit	=	HEX 04	
Dah	=	HEX 0E	
<EOC>	=	HEX 50	end of character indicator
<EOM>	=	HEX 55.	end of message indicator

These timings may be varied according to the following rules:

1) a dit and a dah must be less than HEX 30
2) an <EOC> must be more than HEX 30.
3) An EOM MUST equal 55.
4) Each HEX unit of a dit and dah equals approximately 10msec of tone

V	K	5	E
04 04 04 0E 50	0E 04 0E 50	04 04 04 04 04 50	04 50
dit dit dit dah <EOC>	dah dit dah <EOC>	dit dit dit dit dit <EOC>	dit <EOC>

To send this to the controller remember to retranslate according to table above – note that a HEX E is sent by hitting the B key.

98750404040B500B040B5004
040404045004500B55 sends
VK5ET

Then drop your transmission. An 'OK' signifies provisional success, although if you made a mistake with numbers you may have errors in the callsign. Wait and find out.

Note the address leads the routine. This routine is a great test of your ability to send a long string of digits and of your keyboard not to bounce! Fortunately you don't have to do this often. The callsign must not exceed 47 bytes or you will corrupt other information stored in the data area (the other messages and the timer variables). This is unlikely to be a problem as the above example only uses 19 bytes and even VK5RBB/M3 would only use 44 and I can't think of a longer legitimate callsign in VK.

You can experiment with the numbers but remember the rules cited above.

Changing the callsign interval

The general principle is to send the address followed by a 6 then two characters defining the HEX delay.

Each unit is about 18 sec so if you want 10 minute:

10*60/18 = 33 decimal or HEX 21.

You will need to send a 2 then a 1.

Your control sequence is 987621

Another example, this time for 15 minute:

15*60/18= 50 decimal or HEX 32

Control sequence is 987632

If your calculation gives say HEX 1A, then you can send the '1' but not the 'A' (see table), you will settle for sending 19 or perhaps 1*

Changing the timeout interval

I have used the same rules and strategy as 'changing the callsign interval', except that the command is 7 instead of 6.

Eg a 3 minute timeout is calculated like this:

3*60/18= 10 or HEX 0A.

HEX A is not available on the DTMF pad so use * which sends a HEX B (see table) and your delay is about 18 sec longer! No big deal.

Control sequence is 98770*

Tail operation

A tail is provided once both mutes are inactive. This is set at approximately ½ second. As an encouragement for people to wait between transmissions no audio from a receiver is fed through for this time (1/2 sec) even if a mute opens. Audio is fed through during callsigns.

A beep is provided under certain control circumstances.

- No beep on tail indicates repeater

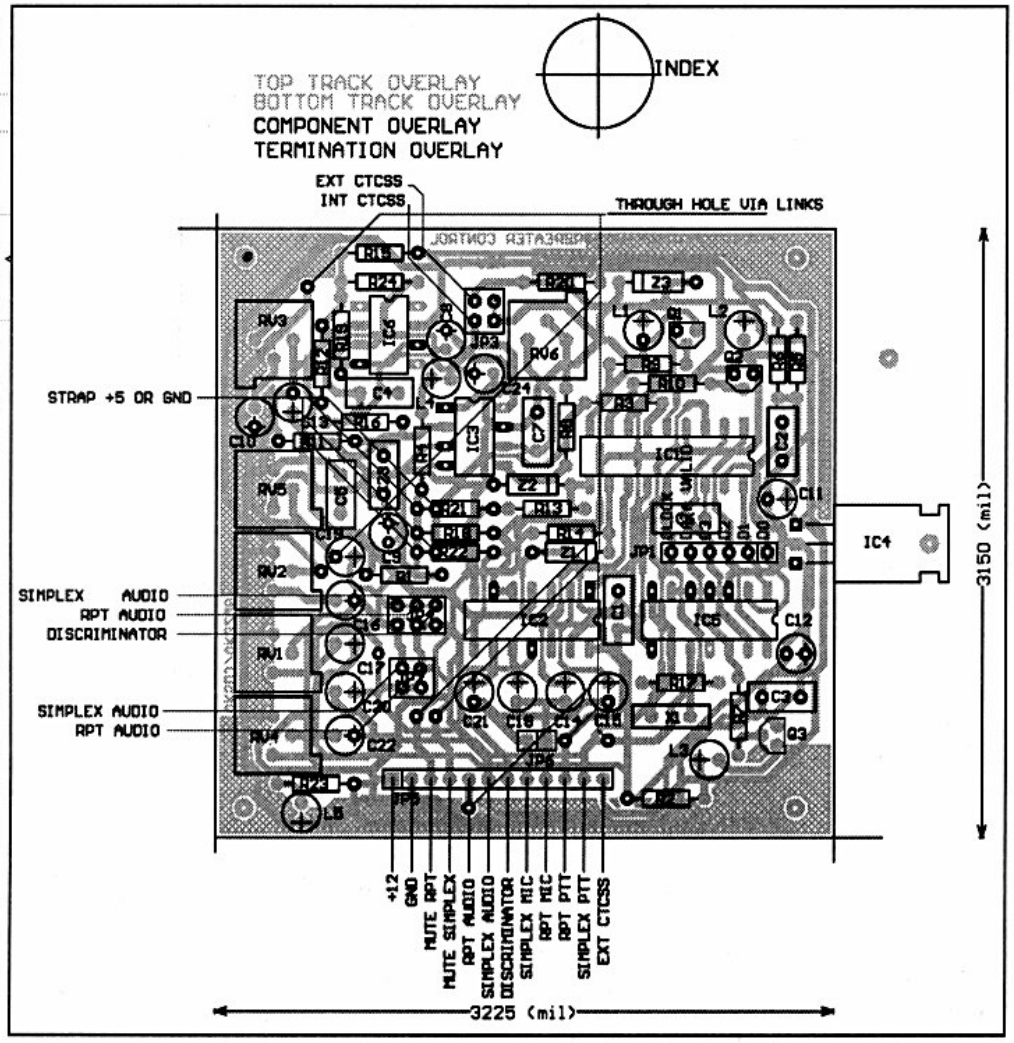

Figure 4. Component overlay

only operation – gateway/link off

- 1 beep on tail means gateway/link on
- 2 beeps on tail indicate timer is inhibited.
- 3 beeps on tail indicate gateway link on and timer inhibited.

A tail (either ½ sec or callsign tail) is always generated on the repeater TX.

Providing the gateway is not inhibited, a tail is generated on the gateway TX if the last mute opening was generated by a CTCSS enabled signal on the repeater receiver, or if the last transmission was on the gateway receiver.

Call signs

Call signs are sent every ten minutes (or as changed by remote control) at the end of the over. If a call is not due at the end of the last transmission of a contact one call sign will be sent at the end of the timing period. The repeater will then go silent until the next mute opening. A call will be generated at the end of this mute opening if 10 minutes has expired since the last.

CTCSS operation

The values on the circuit suit reception of a 118.8 Hz CTCSS signal. These low frequency signals are attenuated by tailoring of the receiver audio, so the board must take its audio from the discriminator circuit or early in the audio chain before tailoring.

Changing C7 or R8 changes the CTCSS frequency beyond the range achievable with control RV6. Lower values increase the frequency. LED L4 lights when a correct tone is received. L4 is a useful tune indicator when adjusting RV6.

For the program written for repeater/gateway operation, the gateway is enabled if the user sends a CTCSS signal. Without the CTCSS the repeater function is normal. This meets a licensing requirement to 'lock out' people without the required endorsements for eg 29 MHz operation of a gateway.

Gateway operation is, in effect, in parallel with normal repeater operation providing the CTCSS is sent.

The CTCSS function can be required for normal repeater access. This may be needed where interference from LIPDs is a problem. See function 4 in remote controls.

LEDs

See Jumper section for orientation of the board for this description.

The CTCSS detect LED is in the North East of the board and lights when there is a valid CTCSS signal received.

The repeater and simplex PTT LEDs are together in the South East corner. The repeater LED is the northernmost of the pair. The simplex PTT LED is the southernmost of the two. They light when PTT is low (i.e. active).

The DTMF valid LED is at the bottom (South West) corner of the board by itself and lights when a valid tone pair is received.

The power on LED is in the North West corner of the board.

Constructors may choose to mount the LEDs on the front panel of the box.

JP1 Test Function

Pin 1 is the output for DTMF decoder (data bit 0) – high if bin 0001 rcvd (see table later but pin 1 is nearest the 7805 voltage regulator)

Pin 2 is the output for DTMF decoder (data bit 1) – high if bin 0010 rcvd

Pin 3 is the output for DTMF decoder (data bit 2) – high if bin 0100 rcvd

Pin 4 is the output for DTMF decoder (data bit 3) – high if bin 1000 rcvd

Pin 5 is data valid and goes high for a valid tone detect

Pin 6 is the output of the Xtal oscillator and should be 3.579 MHz

Jumpers

With the board held with components up and the main connector on the left (west) and the voltage regulator at the bottom (south); the trim pot for the CTCSS is to the east. From an imaginary point in the centre of the board the angles locate each jumper.

H means the jumper lies east/west, V means the jumper lies north/south.

Position number 1 is always either the northernmost or the easternmost position.

Position number 2 is the next to the south or west and so on.

JP1 are test points see above (190 degree) with pin 1 nearest the 7805

JP2 controls the source of the audio for the DTMF tones. (300 degree)

- H, 1 = repeater receiver audio
- H, 2 = simplex audio

JP3 internal or external CTCSS input to 16F84A (75 degree)

- V, 1 = external CTCSS decoder
- V, 2 = internal CTCSS decoder

JP4 audio source for CTCSS (320 degree)

- H, 1 = repeater receiver audio
- H, 2 = simplex receiver audio
- H, 3 = discriminator audio from repeater receiver

JP5 main interconnector – see above (270 degree)

JP6 join microphone points (270 degree)

- V, 1 on = microphones are joined (gateway/link condition)
- V, 1 off = microphones separated - single repeater or range extender model.

Construction

Drill the mounting holes for your box, and trial mount the board.

Make the following decisions:

1. What polarities do the transceiver(s) require? If you have active low mutes install R21, R22 to +5 V (examine board). If one (or both) is active high then take R21 and/or R22 to earth. The board provides for this. The program in the PIC will need to be modified for active high. If the transmitters require active low then everything is fine as is, otherwise the program in the PIC will need to be changed. If you don't want to have the program changed then you will need to build external inverters where necessary.
2. Where do you want to mount the LEDs? If you want to put these on the front of the box then obviously you will install wires rather than the LEDs on the board.
3. Decide if you will be using CTCSS. If not you will not need the components associated with CA3140 and LM567. But you will need to include JP3, R4, and bridge L4. (You'll have one less LED so don't drill your front panel for it!!)

Mount the socket for the 16F84 (strongly recommended, you might want an updated program one day). Note notch is to the regulator end.

Install the 7 jumpers (from top to bottom of board)

Install JP1-6

Install all the resistors but note positions of R21,R22. Solder to upper board and bottom trace where jumpers are required.

Install all the capacitors. (solder top and bottom where traces exist.)

Install voltage regulator LM7805.

Either solder LEDs to board or attach wires for LEDs to be mounted on front panel at a later date. I suggest at least dangling the 'power on' LED temporarily on its wires for the next check.

Apply +12 V to board and ensure that +5 V is available in appropriate spots eg pin 4,14 of PIC.

Remove voltage and solder remaining solid-state devices – leave PIC out of socket for the moment.

Install in box and wire the board to the DB25 on the rear of the box. I used pins 1-12 to maintain the integrity of the numbering system.

Wire the LEDs located on the front panel and a power switch if you wish. I didn't use a switch, preferring the control logic to boot up as soon as the rigs have power to avoid unpredictable states in the rigs.

Testing

The following assumes active low situations. If not, you will no doubt work out your own testing procedure by inverting the logic. Pin numbers refer to either the DB25 or JP5 if you followed my advice on connections.

Temporarily connect the following:

- Switch R – SPST between pin 3 and earth (pin 2)
- Switch S – SPST between pin 4 and earth (pin 2)
- A SPDT switch and a headphone socket to listen to either pin 8 or pin 9 (earth is common)
- A SPDT switch and a socket to enable audio either from a receiver or an audio generator to direct audio to either pin 5 or pin 6.
- The capacity to measure the voltages at pins 10 and 11 (the PTT outputs)
- Connect jumpers – JP2, 1&2 JP4, 1&2JP3, 1&2

On power up, the controller is set with gateway off.

Test logic functions:

- Headphone listening to repeater mike – pin 9 (Switch R)
- RV5 half way
- Close switch R
- LED2 lights.
- Open switch R
- LED2 stays on for ½ sec (or possibly longer if it decides now is a good time for a callsign). Repeat opening and closing R to see if it matches your expectation.
- Close switch R and leave it on. After about 5 minute you should hear 'TO' in Morse and LED2 should go out when the TO is finished.
- Open switch R and you should again hear 'TO' and LED2 lights as 'TO' is sent. The system will again respond to opening and closing of switch R.
- Wait a little longer and after a Closure/opening of switch R a callsign should be generated. LED2 again indicates the PTT state for the repeater.
- Use a multimeter to see that pin 9 is going low when the LED2 lights. At other times it should be at about 12 V.

Test DTMF capability:

Connect a DTMF generator (or a receiver) to the appropriate input (pin 5 with the test jumpers in place). Send a tone, LED 3 should light. If not adjust RV4.

With no input check the voltage on pins 1,2,3,4 of JP1. These should be at 0 V. Send a DTMF C and check that all pins 1,2,3,4 are high.

If logic and DTMF decode don't seem to work then check with a CRO that there is a 3.58 MHz clock on pin 6 of JP1

With switch R closed, send the address and a 1 (eg 9871). Open switch R, hear an OK in the headphones, and then note that LED2 no longer responds to switch R (the TX has been inhibited.)

With switch R closed, send digits 9878 (password+8). Open switch R and hear the OK and LED2 again follows switch R.

Test CTCSS if installed

Feed a low level CTCSS tone into the appropriate pin (for the test setup use pin 5 and bridge JP4 bridge H1). I suggest 118.8hz. Adjust both RV6 (freq determination) and level RV3 for lighting of L4. Reduce level and retune RV6 for LED4 to find the most accurate setting of RV6. The level potentiometer will need to be reset when the receivers are finally connected. Note that I strongly recommend that you connect as close as possible to the receiver discriminator as receiver audio chains attenuate CTCSS tones.

The 567 tend to drop out when there is a whistle or loud speech. The program allows for this and has a hang facility built in. As long as the LED flashes once every couple of seconds the system will work.

Audio switching:

With different audio provided to the two receiver output pins, switch R and switch S alternately note the different combinations of audio. Potentiometers RV1 (simplex TX audio) and RV2 (repeater TX audio) adjust levels.

Final test

Connect to your transmitters and receivers. All levels will need to be reset. Connect jumpers as appropriate. Generally JP6 is bridged EXCEPT when you use the board as a range extender or simple gateway. Check general operation. It is at this time that some nice instruments help. Otherwise do what I do, get a group together to monitor your experiments as you adjust levels, flicking to and fro from the direct path to get an idea of similar levels – crude but it works.

Mounting

The production board will fit quite nicely in a small instrument case 110 X 140 X 35mm (Dick Smith H2512 - $9.75). A DB25 socket mounted on the rear is a simple way of achieving connectivity to the transceivers.

General notes

Note that in the parts overlay and circuit diagram LED L5 is the wrong polarity. It will need to be inverted. In addition, the photographs of the populated board do not show R24 (3M3). A last minute change of circuit for the low pass filter meant that R24 was installed under the board for the prototype board in the photos. The parts layout and board patterns show R24 (3M3) in its new position near IC6. Don't let my photos of the board confuse you with regard to R24. Also note that the overlays have labels to JP2 and JP4 reversed for repeater and simplex audios.

I would like to thank Russell VK3ZQB for drawing the circuit so well, the development of the parts lists and layout, and the preparation of the board. Without him the board would be hand drawn, twice the size and have many links. The support of Michael Carra in building a controller and discovering errors in the documentation is also appreciated. Thanks Russell and Michael.

Have fun, I'm prepared to help people with specific needs.

Repeater controller parts list

Part designator	Value	Footprint	Type	Critical value
C1	0.01 uF	RAD0.2	Philips ceramic	No
C2	0.01 uF	RAD0.2	Philips ceramic	No
C3	0.01 uF	RAD0.2	Philips ceramic	No
C4	0.016 uF	RAD0.2	Poly	Yes
C5	0.1 uF	RAD0.2	Poly	No
C6	33 pF	RAD0.2	Philips ceramic	Yes
C7	0.47 uF	RAD0.2	Poly	Yes
C8	10 uF	RB.1.2	10V tant	Yes
C9	10 uF	RB.1.2	10V electro	No
C10	22 uF	RB.1.2	10V electro	No
C11	10 uF	RB.1.2	10V electro	No
C12	10 uF	RB.1.2	10V electro	No
C13	1 uF	RB.1.2	10V tant	Yes
C14	6 uF	RB.1.2	10V electro	No
C15	6 uF	RB.1.2	10V electro	No
C16	6 uF	RB.1.2	10V electro	No
C17	6 uF	RB.1.2	10V electro	No
C18	6 uF	RB.1.2	10V electro	No
C19	22 uF	RB.1.2	10V electro	No
C20	6 uF	RB.1.2	10V electro	No
C21	6 uF	RB.1.2	10V electro	No
C22	22 uF	RB.1.2	10V electro	No
C23	0.016 uF	RAD0.2	Poly	Yes
C24	22 uF	RB.1.2	10V electro	No
R1	10k	AXIAL0.4	¼ W carbon	Yes
R2	2k2	AXIAL0.4	¼ W carbon	No
R3	100k	AXIAL0.4	¼ W carbon	No
R4	2k2	AXIAL0.4	¼ W carbon	No
R5	2k2	AXIAL0.4	¼ W carbon	No
R6	2k2	AXIAL0.4	¼ W carbon	No
R7	2k2	AXIAL0.4	¼ W carbon	No
R8	10k	AXIAL0.4	¼ W carbon	No
R9	10k	AXIAL0.4	¼ W carbon	No
R10	10k	AXIAL0.4	¼ W carbon	No
R11	47k	AXIAL0.4	¼ W carbon	Yes
R12	10k	AXIAL0.4	¼ W carbon	Yes
R13	2k2	AXIAL0.4	¼ W carbon	No
R14	2k2	AXIAL0.4	¼ W carbon	No
R15	4k7	AXIAL0.4	¼ W carbon	Yes
R16	47k	AXIAL0.4	¼ W carbon	Yes
R17	1M	AXIAL0.4	¼ W carbon	Yes
R18	10k	AXIAL0.4	¼ W carbon	No
R19	4k7	AXIAL0.4	¼ W carbon	Yes
R20	2k2	AXIAL0.4	¼ W carbon	No
R21	22k	AXIAL0.4	¼ W carbon	No
R22	22k	AXIAL0.4	¼ W carbon	No
R23	4k7	AXIAL0.4	¼ W carbon	No
R24	3M3	AXIAL0.4	¼ W carbon	No
IC1	PIC16F84	DIP18	4MHz is OK	Yes
IC2	4066B	DIP14	Quad switch	Yes
IC3	LM567	DIP8	PLL tone decode	Yes
IC4	LM7805CT	TO-220	5V reg	Yes
IC5	MC145436	DIP14	DTMF decode	Yes
IC6	CA3140	DIP8	OpAmp	Yes
L1	LED	RB.1/.2		No
L2	LED	RB.1/.2		No
L3	LED	RB.1/.2		No
L4	LED	RB.1/.2		No
JP1	HEADER 6	SIP6		Yes
JP2	HEADER 2*2	IDC4		Yes
JP3	HEADER 2*2	IDC4		Yes
JP4	HEADER 3*2	IDC6		Yes
JP5	HEADER 12	SIP12		Yes
JP6	CON2	SIP2		Yes
Q1	BC548	TO-92A		No
Q2	BC548	TO-92A		No
Q3	BC548	TO-92A		No
RV1	10k	VR4	Cermet trimmer	No
RV2	10k	VR4	Cermet trimmer	No
RV3	10k	VR4	Cermet trimmer	No
RV4	10k	VR4	Cermet trimmer	No
RV5	10k	VR4	Cermet trimmer	No
RV6	10k	VR4	Cermet trimmer	No
X1	Crystal	XTAL.1	3.579 MHz	Yes
Z1	5V1	Zener diode	400 mW	Yes
Z2	5V1	Zener diode	400 mW	Yes
Z3	5V1	Zener diode	400 mW	Yes
Socket	18 pin	DIP 18	400 mW	Yes

Use tantalum capacitors where indicated, but if you have them on hand, I recommend you use tantalums for all the large value capacitors for their better stability and life. Where a part is designated as "critical" changing the value may have undesired consequences. In other locations the values are quite non critical such as the audio coupling capacitors. In a few places balance is important, such as R15, R19 because they set up a voltage divider. The critical point here is that they are equal in value so a pair of 6k8 would work fine instead of the 4k7 (similarly R1, R12). Voltage ratings won't be an issue as long as they meet or exceed 6 V for most of the parts, except C11which must be greater than the supply voltage where a 16 V rating would be fine.

ar

A CW transceiver for 40 metres

Joe Rotenberg VK3BBN

Having given away my transmitting gear and then thought it might be fun to go on the air after all, I thought I might start by getting back on 40 metre CW.

Here then is a low powered transceiver (measured output = 1 watt) for the CW end of 40 metre. It features a superhet receiver, break-in, and a single knob controlling the tuning of both the transmitter and receiver in step.

Photo 1 shows the transceiver set up in operation, whilst photo 2 shows it with the cover off. Figs 1 and show the circuit diagram.

Design philosophy

In this project I have tried to use only components which are very readily available from the usual suppliers: no unusual ICs, slow motion drives or ceramic variable capacitors (the tuning capacitor is a standard transistor broadcast type). This has resulted in a circuit, which may be rather complicated, but on the other hand chasing up odd components at hamfests and out of the way overseas suppliers may also be a complicated procedure.

Principle of operation

Referring to the circuit diagram, the signal is generated by first mixing the VFO (at 3 MHz) with a 4 MHz oscillator in the "transmitter mixer oscillator". This produces a sum product at 3 + 4 = 7 MHz, which is filtered from the other products by the "transmitter bandpass filter". After that it is passed through the "buffer" and "driver" stages, and finally the "power amplifier". At this stage, the signal will not be sinusoidal, and so the "low pass filter" is used to filter out the higher harmonies and produce a clean sinusoidal signal into the antenna.

To receive a signal, it comes in through the antenna and low pass filter to the "receiver band pass filter", which lets through only signals around the required 7 MHz. After that it is mixed in the "receiver mixer" with the signal from the VFO. Since the same VFO is used for both the transmitter and receiver, they tune in step. The output of the mixer goes to a narrow "crystal filter" which selects the required signal from others close by.

After amplification in the "intermediate frequency amplifier", the signal is mixed in the "product detector" with the beat frequency oscillator at approximately 4 MHz. This oscillator is offset slightly in frequency to the one in the "transmitter mixer/oscillator", and therefore a signal on exactly the output frequency of the transmitter will come out as an audio note from the product detector. This is then amplified by the "audio amplifier" and fed to the headphones.

Also there is a "control and power" section, which supplies the various supply voltages: 12 volt for the transmitter power amplifier and driver, 9 volt Tx for all other transmitter section power, and 9 volt for everything else.

Special features

Within each block, the circuitry is fairly conventional and examples can be found in the ARRL and RSGB handbooks, but several features may be worth commenting on:

1. The back to back diodes in the "receiver bandpass filter". This is a clever idea, which I first saw in a circuit by Lewallen that appeared in ARRL handbooks of the 1980s, though it may well be older.

   Referring to the circuit, when the set is in "receive" mode there is not much signal across the diodes. Therefore they act as open circuits. Thus the 39 pF capacitor and 13 µH inductor form a series tuned circuit which lets the signal through.

   On "transmit", however, the signal is much stronger and the diodes conduct. Not only is the inductor then shorted out, but the capacitor

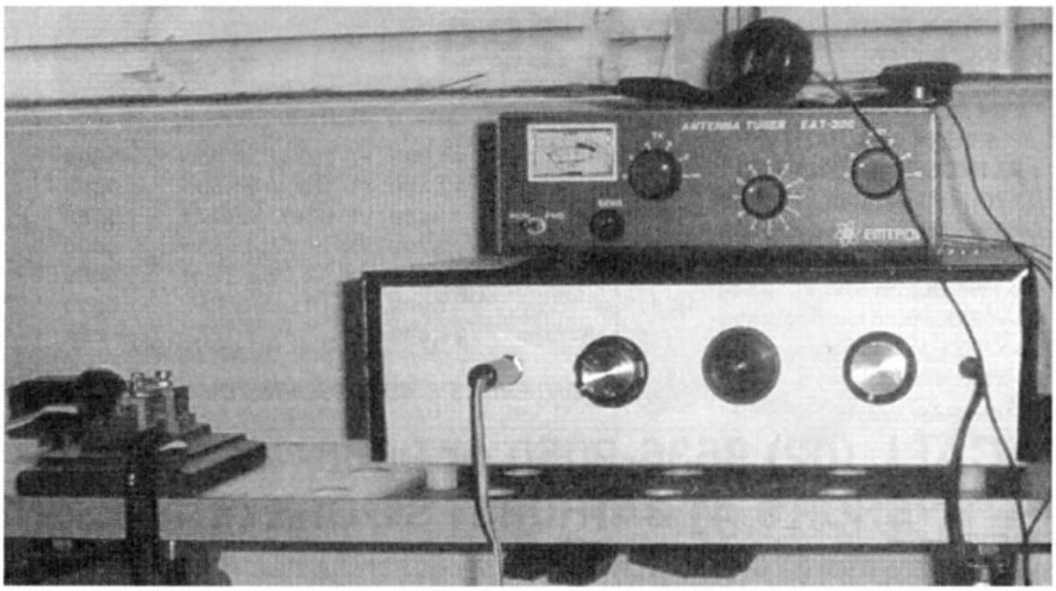

Photo 1

and inductor are now no longer a pure series tuned circuit, and so the 39 pF capacitor, one end now grounded through the diodes, presents a higher impedance than when that end was allowed to swing free. This isolates the receiver and transmitter.

2. The BD139 transistor used in the power amplifier. This transistor is actually listed (and is therefore priced) as an audio power amplifier, but its unity gain bandwidth is as high as 250 MHz and it is therefore quite suitable for RF use.
3. The cascode circuit in the intermediate frequency amplifier. The "cascode" circuit was used in the old valve TV tuners, and consisted of a triode amplifier with the cathode of a second triode directly on the plate of the first. The idea is to keep this plate at a steady voltage and so reduce the possibility of instability through feedback via the valve's plate-grid capacitance.

I have used this idea here. The MPF102 input FET has a BC548 transistor sitting directly on its drain. In this way I hoped (and succeeded) in keeping the circuit stable. Otherwise it might have taken off as a "tuned plate - tuned grid" oscillator.

4. Use of a broadcast variable capacitor. Since the tuning range for 40 metre CW (7 - 7.03 MHz) is small it is possible to use one of these without a slow motion drive.

Construction

The circuit was built on a double-sided printed circuit board. The top side is a ground plane above which the components sit, with holes for their leads to go through without touching (unless, of course, they are ground connections, in which case they are soldered directly to the top sheet).

Since it is never possible to design a printed circuit board exactly right the first time, the errors are snipped out and new work done above it "rats' nest style" to replace it.

If there is enough interest, I will redraw the printed circuit board in the light of these corrections and supply it to any interested reader. Please write to me at GPO Box 789, Melbourne, 3001. An A4 sized SASE would be appreciated. Of course the offer is on the understanding that it is only for the reader's personal use and not for any commercial or other monetary gain.

Cost

The cost of the transceiver using all new parts and including the cabinet was around $140.

Alignment

The alignment of the transceiver may be done in the following order:

1. Turn drive to a minimum (ie make the 500 ohm trimmer in the "driver" stage a maximum). This is done to protect the power amplifier.
2. Put a 50 ohm dummy load at the antenna socket.
3. With the key down, a whistle should appear in the phones. Adjust

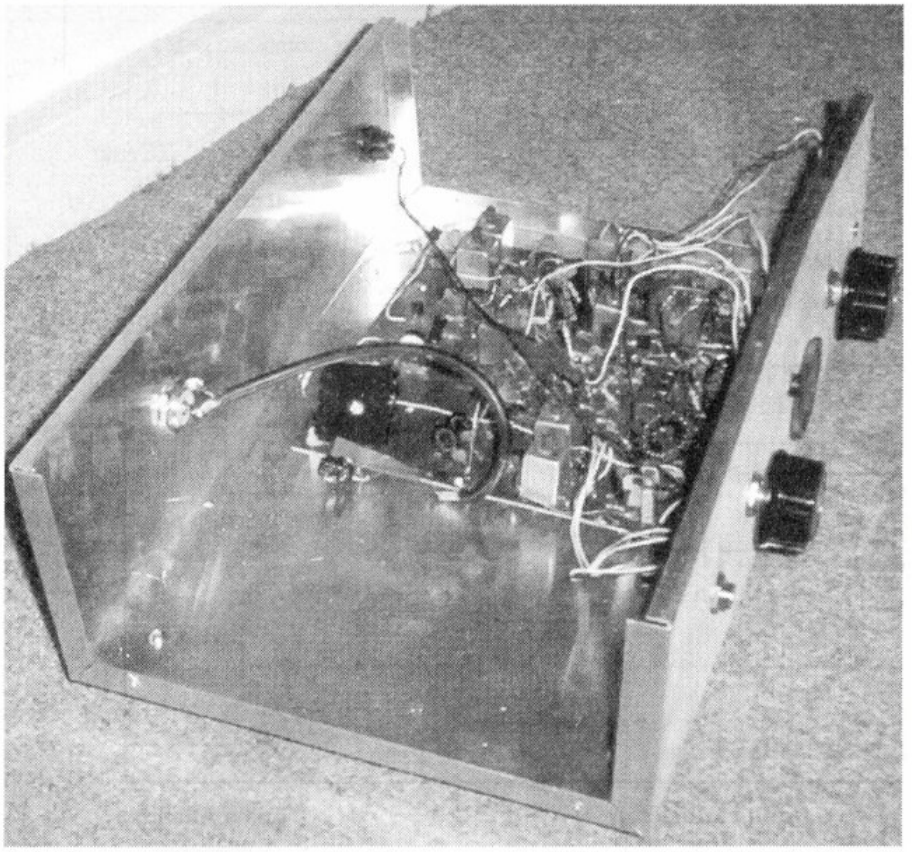

Photo 2

the trimmer in the "transmitter mixer oscillator" until the pitch is pleasant.

4 With the tuning knob fully anticlockwise and trimmers on the tuning capacitor set to a minimum adjust the slug until the VFO frequency is exactly 3 MHz, as heard on a communications receiver.

5. With an oscilloscope or RF probe on the gate of the "buffer", adjust the slugs in the "transmitter bandpass filter" for maximum output.

6. Increase the drive to the maximum that still gives a sinusoidal output at the antenna. If an oscilloscope is not available, adjust the drive for 1 watt output at the antenna (= 10 volts peak into 50 ohms).

7. With a high impedance voltmeter measuring the AGC voltage (ie the top of the 10 M resistor) adjust the slugs in the "receiver bandpass filter", "receiver mixer", and "if amplifier" for a maximum negative voltage with key down.

The set should now be aligned, and this can be confirmed by connecting an antenna.

On the air

With a set having a low output power and good receiver, such as this one, don't expect others to hear you as well as you can hear them, especially if your antenna is not the best. Nevertheless, in the few weeks that I have had this set operational, I have worked stations as far away as Queensland and New Zealand and quite routinely had long chats with stations in NSW and Tasmania, to say nothing of country Victoria and, of course, the Melbourne Metropolitan area, where I live.

On receive, of course, it is possible to hear stations from all over the planet.

This, then, is a project I have presented as something to build of reasonably high performance for those who do not have large junk-boxes and would rather buy all the components easily. If you try building it (or if you have any other comments), please write to me and let me know how you get on.

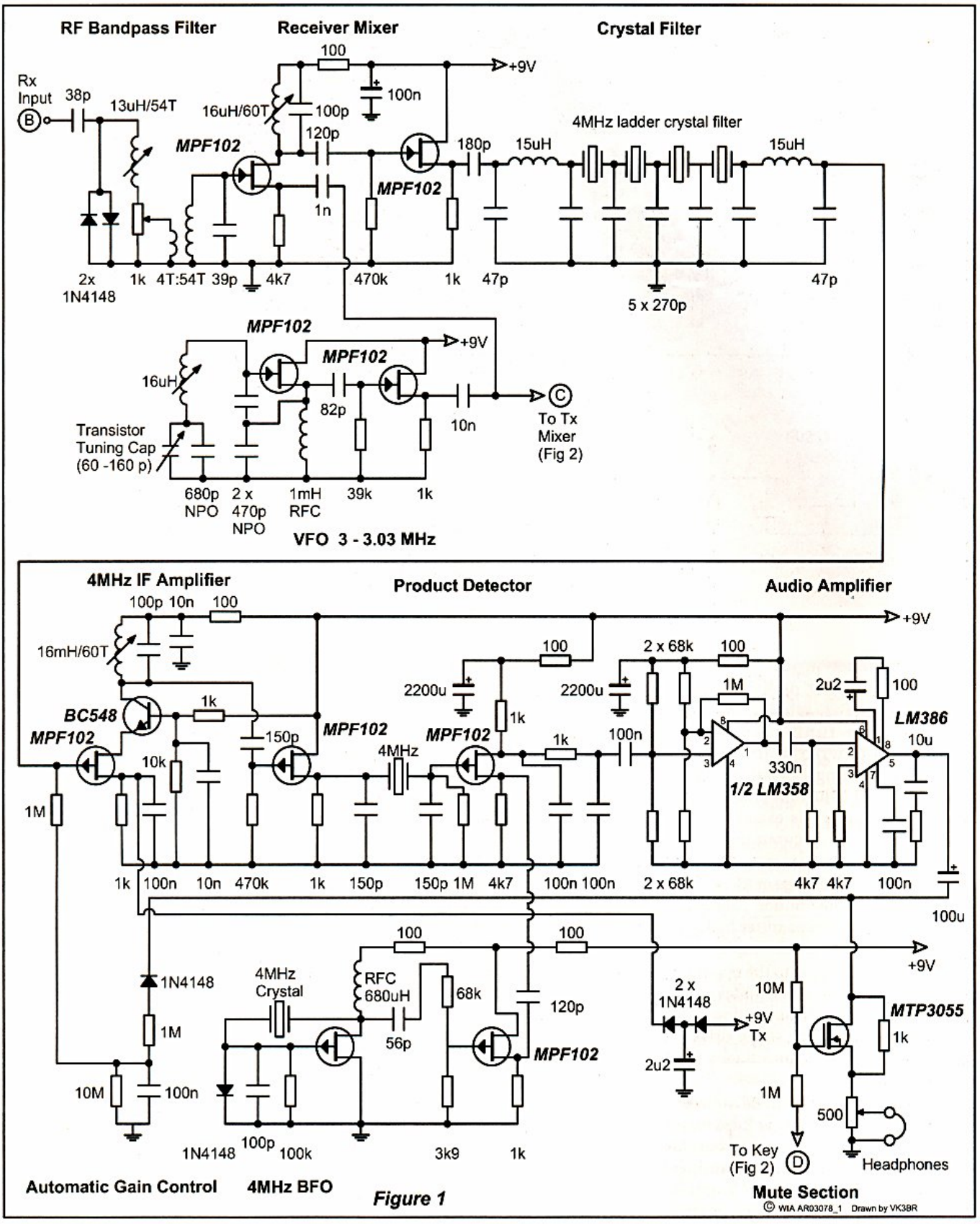

Figure 1

Fig 1 – Receiver and common section. All adjustable inductors assembled on 4.83 mm diameter by 14 mm height screened formers with F16 slug.

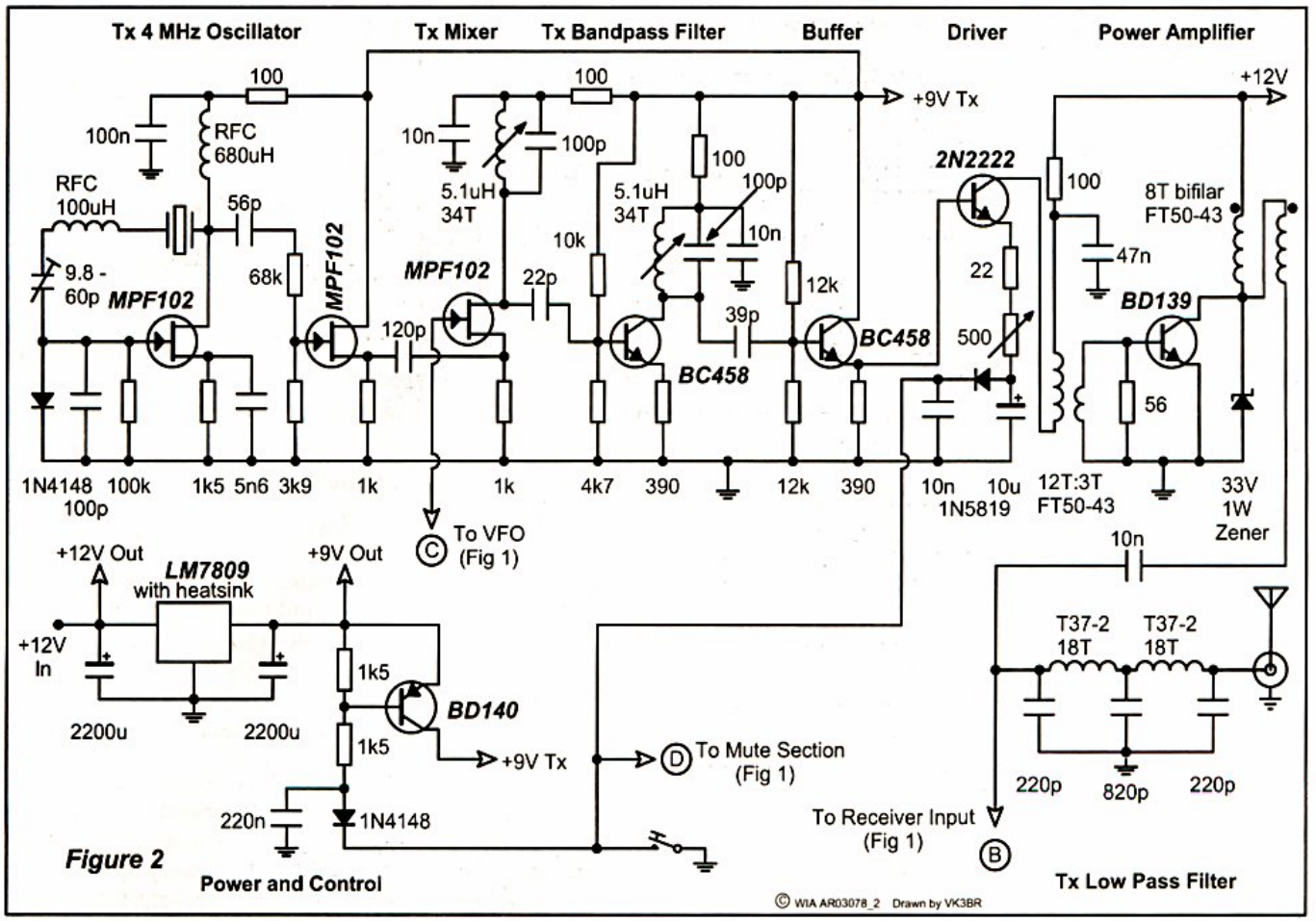

Fig 2 – Transmitter and control sections. All adjustable inductors assembled on 4.83 mm diameter by 14 mm height screened formers with F16 slug.

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WIA comment

The WIA position on Broadband over Power Line (BPL)

continued from page 3

to large scale rural areas with minimal infrastructure cost.

The real problem is that BPL is one of those things that 'can be shown to work' at the trial stage and once the investment is made, it is very difficult to terminate such a system, no matter how poor it turns out to be in reality.

Due to the very nature of BPL, the WIA believes that the responsible department, the Department of Communications, Information Technology and the Arts (DoCITA) and the Australian Communications Authority (ACA) must consult widely with due regard to the risks involved in the introduction of a problematic technology, and having full regard to emerging alternative technologies. The WIA strongly believes that DoCITA and the ACA should tread very carefully on this issue for the long term benefit of the nation and not be persuaded by commercially attractive short term band-aid solutions, which may leave Australia with a technology which is neither economic nor capable of being upgraded to rapidly expanding consumer demands.

The WIA supports increasing broadband access and broadband competitiveness in Australia, but in a way that does not cause harmful interference to legitimate users of the high frequency spectrum. The WIA supports the development by the ACA of policies that protects existing spectrum users, which includes but is certainly not limited to the amateur service.

- The WIA has formed a working group on BPL matters with coordinator WIA director, Phil Wait VK2DKN, David Wardlaw, VK3ADW, Owen Duffy VK1OD, Barry White VK2AAB, Rick Warnett P29KFS and Fred Johnson ZL2AMJ.
- For more information on BPL refer to the WIA website at www.wia.org.au or those of the RSGB and the ARRL at www.rsgb.org.uk and www.arrl.org . BPL news is also a regular feature on the WIA national news broadcast.

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The 204BA, a 4-element 20 metre beam

plus a rotatable 40-cum-30 metre dipole (Part 1)

Bob Slutzkin VK3SK

For more than twenty years now, I have been experimenting with various types of dipoles strung across beams. I have lost count of the number of different antennas I have tried, but until now each one has failed in one of the following:

- **Good radio performance,**
- **Ease of construction,**
- **Ease of tuning,**
- **Mechanical and structural strength,**
- **Durability.**

What I am about to describe is a simple device built around my 204BA 20 m beam which satisfied all of the above criteria, the only possible doubt being the durability of one component. The antenna was intended for use as a 40m dipole, and by pure luck it turned out that it also works just as well on the 30m band.

The HY-Gain 204BA is a 4-element 20 m beam with a reflector, a driven element and two directors on a 26 foot boom. (All measurements in the HY-Gain manual are in inches, so please excuse me for staying with Imperial measurements)

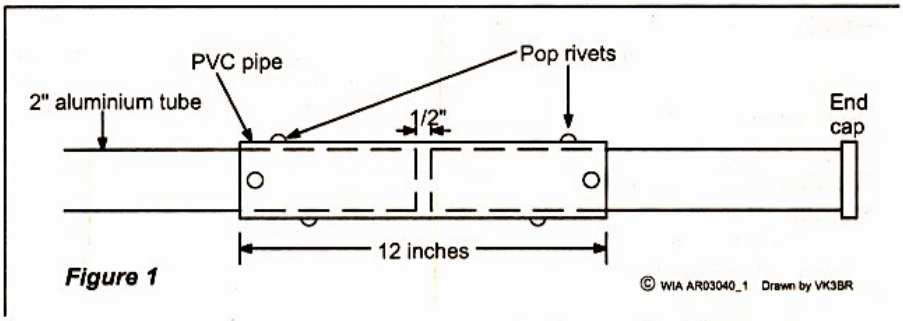

Fig 1 – Insulating sleeve joint at director end of modified boom.

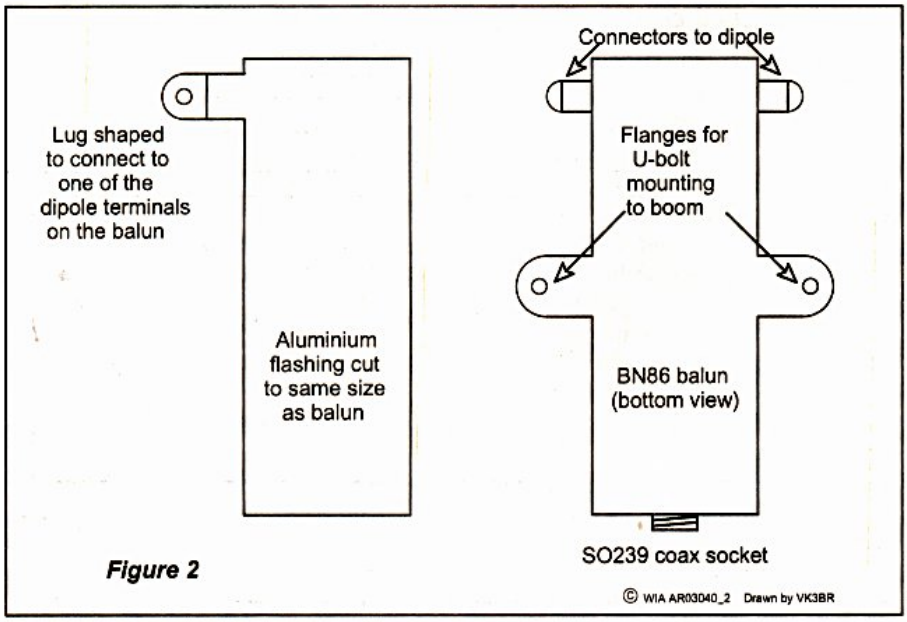

Fig 2 – Balun and aluminium flashing connection plate.

The boom

Only one modification to the beam was needed. This was to insulate the 2nd director from the boom, and there are many ways that this could have been done. The simple and inexpensive method I used was to put an insulating sleeve joint near the end of the boom that supports the 2nd director. I would not have hesitated to cut the existing HY-Gain boom, 18 inches from its end, but I happened to have some old aluminium irrigation pipe of the same diameter and gauge from previous projects. I therefore used one 60 inch and another 18 inch length of that material instead.

For the sleeve, I used a 12 inch length of 50 mm storm water PVC pipe from the local hardware shop, and details of the sleeve joint are shown in fig 1. The sleeve makes such a tight joint that it was necessary to ram the parts together against a wooden block. The joint was then fixed with a few random pop-rivets. To make sure that the sleeve was centrally placed with a half inch gap inside, I put the sleeve over the longer part first, up to a previously marked 5 ¾ inch line and riveted before continuing. For the next step of inserting the shorter part, I securely tightened a worm type hose clamp over the tube at its 5 ¾ inch mark to provide a stopper (because I had

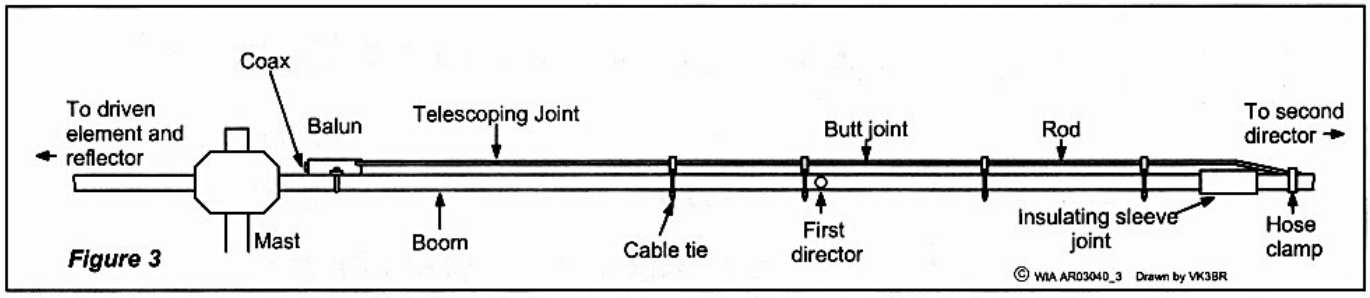

Fig 3 – Modified boom and rod layout.

previously found that it is very difficult to pull such a tight fitting sleeve joint apart). The durability of the PVC pipe used in this way while exposed to the UV and weather is the doubt mentioned above

The beam was then put back together using the modified boom.

The balun

A balun was attached to the boom adjacent to the supporting mast, with one of the balanced terminals connected to the boom and the other to a rod, which will be described shortly. I used a HY-Gain BN86 and cut a piece of builders' flashing aluminium to fit under the balun and connect to the terminal as shown in Fig. 2 (Any 1:1 balun could have been used with a little improvisation.).

The rod

A 12 foot telescoping aluminium tube of around about ½ inch diameter was required. There are firms that stock long lengths of tubing in imperial telescoping sizes (one VK3 source is "Light Spars of Australia" at 6 Horscroft Place, Moorabbin). I was able to recycle parts from older projects for the job.

An inch or so of one end was flattened for clamping under that hose clamp, and the other end was also flattened and a ¼ inch hole drilled for connection to the balun. A slight bend where the rod is clamped to the boom and a corresponding bend a short distant out enabled the rod to lie on a parallel line 2 inches from the boom as shown in fig 3.

Stand-offs

Four stand-offs were made of 3 inch lengths of the black 20mm tubing of the type used in garden sprinkler systems (but bits of garden hose would have done just as well). These were cable-tied to the boom through small holes across the base, and the rod was threaded through tight fitting holes at the top as shown in fig 4. This turned out to be an ideal method of holding the rod firmly in place.

Results

Preliminary measurements were made on an MFJ 259B analyser with the expectation that some adjustments would be required. But none was needed. The SWR was between 1.5:1 at 7.05 rising to 2.1:1 at 7.3 MHz. But the bonus! The SWR was also 1.3 :1 over the 30 m band (see fig 5).

I find the antenna ideal for local chats on 30 and 40 which usually rely on high angle radiation. For this the antenna appeared to have only a small amount of directivity. I am not a DX enthusiast; but the other night I tried rotating the antenna while listening to W5TZC chatting to a ZL; and measured at least 3 S units front-to-side on their signals. When they signed, I gave the W5 a call, and he gave me 4 by 4, saying he had picked me out as the strongest of those who were calling him, but my power output was only about 70 watts.

The drawings show how simple the whole thing is. In part 2, I shall give a run down of some of the experiments that I and others have done along these lines, and try to solve the mystery of why the antenna works on 30 metres.

(Part 2 next issue)

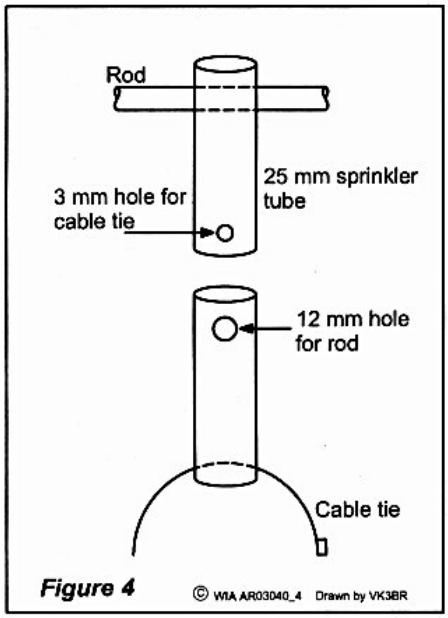

Fig 4 – Rod standoffs.

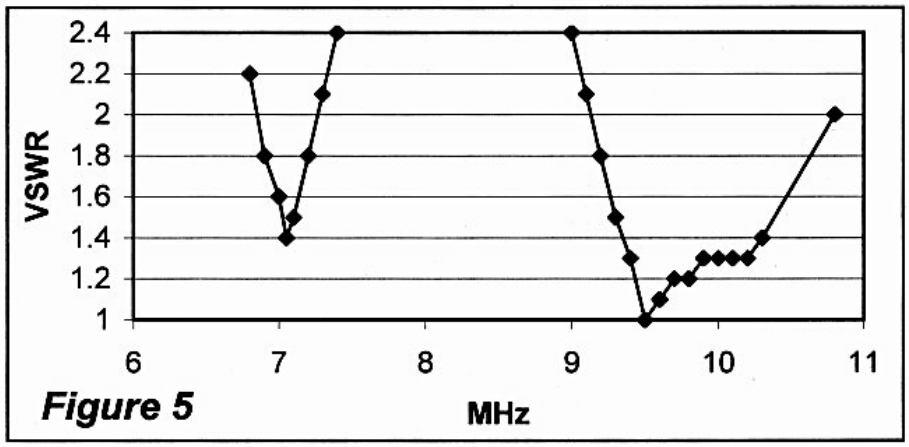

Fig 5 – VSWR vs frequency plot.

Skills shortages

in the electrical, electronics, ICT, instrumentation and automation manufacturing sectors

Many authors have written about the apparent skills shortage problem in the electrical, electronics, ICT, instrumentation, automation, and allied manufacturing sectors. The problem is not new and has been emerging as an issue since about the mid 80s.

The problem manifests itself in many ways. From personal experience I see this manifestation in the lack of practical electrical knowledge in secondary school students, superficial knowledge and skills in apprentices, trainees and some undergraduates, and the lack of personal enthusiasm by new entrants into the industry.

This should not be interpreted in any way as a slur against the persons concerned or the education system that they have been exposed too. It is however symptomatic of the problem of computers in the home and schools effectively replacing electronics as a hobby.

Prior to the early to mid 80s, people, typically teenagers and young adults, who had a personal interest in electronics often drifted into amateur radio or audio and Hi Fi to fulfil their interest. Magazines such as the now defunct Electronics Australia were eagerly read by enquiring minds. Amateur radio was a hobby of choice because it offered, and still does, a low cost avenue for enthusiasts to gain hands-on skills in the design, construction, fault finding, operation and establishing of a radio station.

From some time in the late 80s potential electronics hobbyists turned to computers, seeing this as the way of the future, and they were right. However, it could be argued that what knowledge was gained about computers was conversely lost about electronics.

Recently, I had the need to have a plug-in power pack for a wireless keyboard and mouse tested as it was thought to be defective. When the IT technician arrived he was asked to test the power pack's output with a multi-meter. To my surprise he did not have one. In fact the entire IT support office did not possess one at all!

The above is not atypical. Computer experts, technicians, hobbyists, etc, are very often quite good at driving their PC. They can use the keyboard, interpret information on the video screen, know their way around the software/application, but know very little about what is happening within the PC electrically. While all of this is fine, where has this left the electrical and electronics industry?

History suggests that people who go into a career with a high level of personal interest in what ever it is they choose to do will often do very well at it. I think back to the number of trades people, technicians, engineers, and scientists I have known over the years, who had an interest in electronics as a hobby, who went on to develop this personal interest into a career and to do very well at it.

Anecdotal evidence from the industry today suggests that employees entering the work force often don't have the level of interest in, or passion about, electronics that their forefathers did. They probably have gone through their teenage years not exposed to any hobby or personal interest in very much if anything electrical, except for a PC!

I hear from employers that they find it difficult to recruit trained staff that have good hands-on skills at component level. And before you say that most electronic equipment is maintained on a remove and replace basis, give some thought to the industries that manufacture and maintain RF, power electronics, avionics, medical, scientific and industrial instruments, motor control centres, and etc. They all do repairs at component level and I have identified but only a few.

An example of where an industry rapidly needs to up-skill its work force to cope with emerging technology

is in the automotive Telematics sub sector. Telematics is the convergence of automotive electrical, electronics, instrumentation, entertainment, navigation, communication, night vision displays, collision avoidance radar, safety systems, automobile and engine control and management systems, the smart office, the smart home, etc, etc.

Consumers are starting to see this technology in most prestige cars and it is rapidly gravitating down to standard production models. One of the problems for the auto industry is that its work force (particularly in the maintenance and servicing subsectors where the majority of tradespeople are mechanics, panel beaters, spray painters and the like), is not trained to handle, let alone diagnose, problems with electronics.

Take the scenario of a crash damaged car requiring panel beating and painting to the rear bumper bar complete with ultrasonic or radar reversing sensors inbuilt. All of a sudden you have painters and metal bashers (and I mean this in the most respectful way) having to remove, repair, paint, and reinstall a car sub assembly containing sensitive electronic sensors! The above is but an elementary example of what is currently occurring, and it will only get worse.

Consider having your car with inbuilt Global Positioning System, or Heads Up Display, or collision avoidance radar repaired by an non-electronics-experienced person. I know of a case recently where it took a colleague four months to have his in-built car entertainment system satisfactorily fixed because no one at the dealer workshop knew enough about the product or the car's system architecture to correct the fault first time around.

Electronics is an enabling technology for many industry vertical such as aerospace, automotive, defence, rail, machine tooling, petro-chemical, food and beverage production, security, etc. Staffs employed in these verticals, now more than ever, need some electrical knowledge and appreciation.

Amateur radio has provided, and still does provide, albeit at a reduced level, Australian industry with a pool of people with hands-on skills gained in their own time because they were interested enough to invest their own resources into their hobby. Other examples of sectors to benefit from this phenomenon are the aviation, aerospace, and automotive industries. There are others.

One way of overcoming the problem that industry is facing is to integrate amateur radio and electronics into secondary school curricula. Until at least the 1980s amateur radio clubs in secondary schools were not uncommon. I wonder how many are in existence today.

Anecdotal evidence from the industry suggests that employees entering the work force often don't have the interest or passion about electronics that their forefathers did. They probably have gone through their teenage years not exposed to any hobby, or to personal interest in anything electrical, except for a PC!

Various governments are currently investigating Careers in Manufacturing strategies. The amateur radio movement, radio clubs, and the WIA may wish to consider the part that they can play by joining forces with governments, education providers, industry and their representative associations by jointly fostering the reintroduction of amateur radio and electronics into secondary schools and to the general community for the benefit of both Australian industry and amateur radio as a hobby.

This should result in a win-win outcome all round as each party gains new entrants, better qualified participants, and a stronger local industry.

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The author's name has, at his request, been withheld. The author is an economic development professional, has been a licensed radio amateur since 1976, and has sectoral responsibility for the electrical and electronics manufacturing sectors within the organisation of his employ. He went on to do an apprenticeship in electronic instrumentation before undertaking post trade, and tertiary studies in business and management.

Fixing-up old broadcast gang capacitors

Drew Diamond, VK3XU,
45 Gatters Road,
Wonga Park, 3115.

There are many amateur radio applications and projects that require variable capacitors of one sort or another. For instance, antenna couplers/ATUs capable of handling moderate power levels (up to about 100 W) can often be made using ordinary broadcast gang capacitors.

Unfortunately, those we now find at swap meets are often in pretty rough condition, typically covered with grime, plates bent and shorting, bearings seized, and mounting feet missing. If the unit is not too badly mangled, it is quite possible for the amateur to restore such components to serviceable condition.

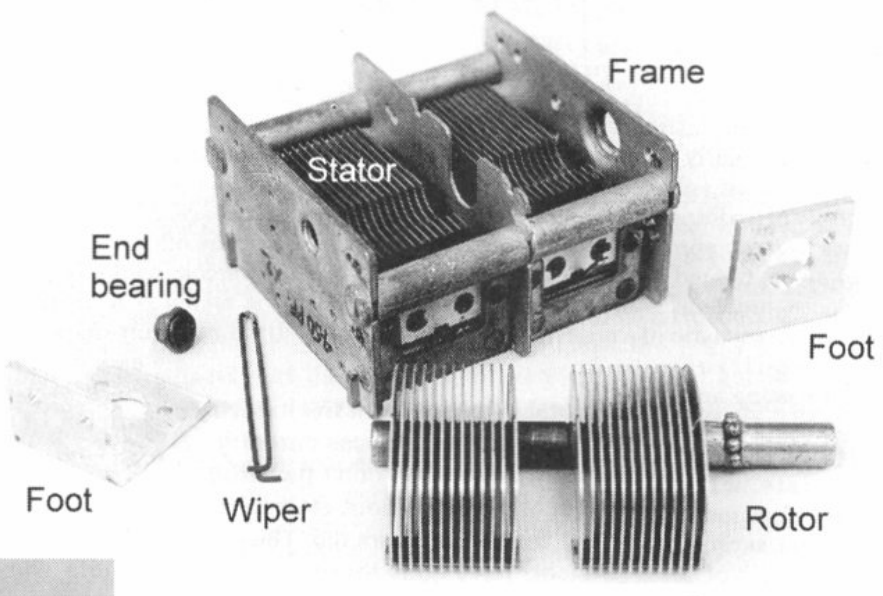

Photo 1 – Component parts.

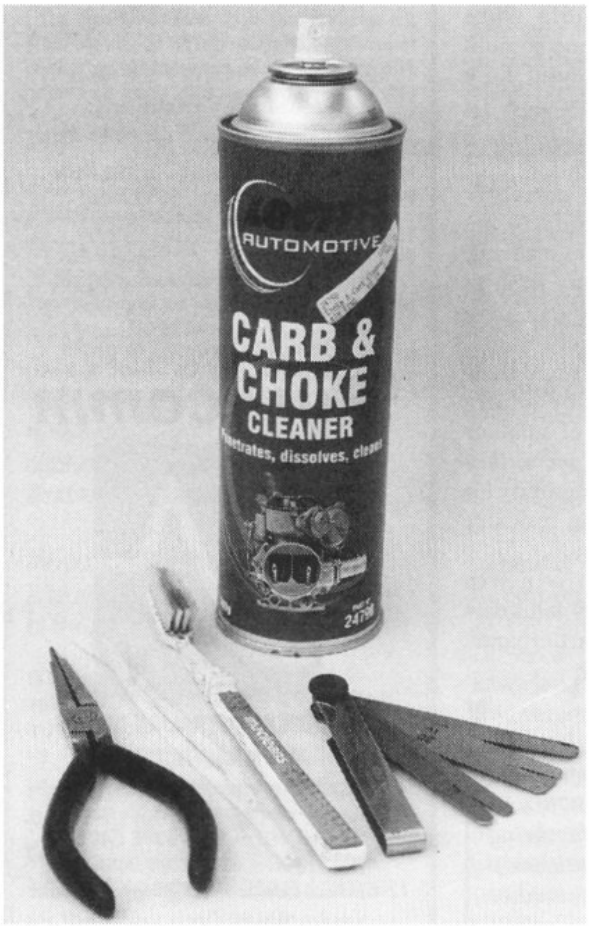

Photo 2 – Special tools.

Refer to Photo 1. Begin by removing the wiper(s), unsoldering where necessary. Take particular note of the orientation of this component. Turn the moving plates (rotor) to their open or "unmeshed" position. Place the capacitor in a suitably large plastic container. Slacken off the lock nut on the rear (ball-housing) bearing, then carefully unscrew and remove the ball housing. Remove the single ball from this part. Now carefully withdraw the rotor from the front bearing, taking care that the (usually) nine balls fall into the container.

Auto shops supply various proprietary cleaners and degreasers, which remove greasy dirt very efficiently from mechanical items, like carburettors. The really effective ones (eg Loctite Carb and Choke Cleaner) are also rather pungent. If you are prepared to use it safely (work outdoors, don goggles and gloves), an especially clean capacitor will result. Use an old toothbrush to scrub the insulators, and a pipe cleaner to remove dirt and grit from between the plates. Remove oily residues as described next.

The rotor and frame/stator should be washed in warm water with detergent or dishwashing liquid using the toothbrush and pipe cleaner to remove any remaining particles from between the plates. Rinse in running water, then immediately place these components to dry in a pre-warmed oven at about 100 degrees C for perhaps 10 or 15 minutes.

Plates that are slightly bent may be straightened with flat "duck-bill" pliers (visible in Photo 2). A set of feeler gauges will aid in getting their spacing correct. Insert various feelers and measure the plate spacing in an un-damaged part of the capacitor, then apply the same feeler to the repaired parts and adjust accordingly. The balls may be simply wiped with a clean cloth.

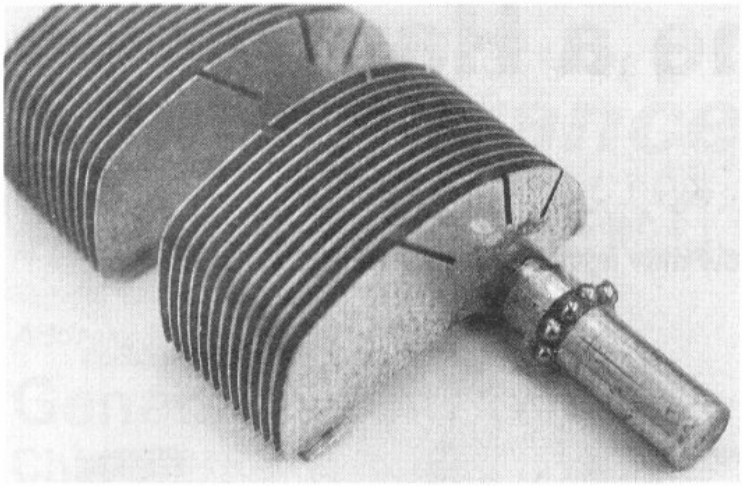

Photo 3 – Rotor, ready for reassembly.

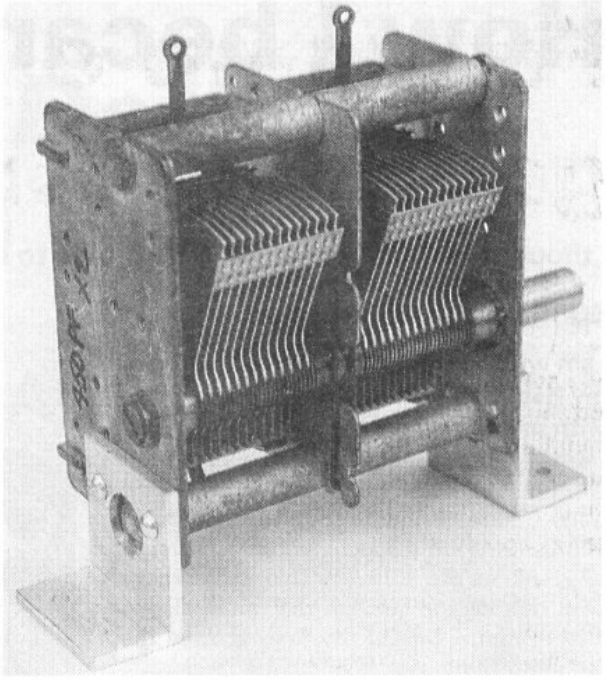

Photo 4 – Restored capacitor.

A source of replacement balls, commonly 1/8th inch (3mm) diameter, is old ball bearings. Remove the dust seal (if fitted) thus exposing the ball-cage. Place the bearing in a strong vice so that the jaws bear upon the outer race diameter. Screw up the vice until you hear the race crack, whereupon the individual balls may be extracted after cutting through the ball-cage in one place.

Reassembly is generally the reverse of disassembly. The nine balls of the front bearing may be attached to the shaft with a sticky grease, such as petroleum jelly (Vaseline TM), as illustrated in Photo 3.

Carefully offer the rotor to the frame in the un-meshed state, and locate the shaft through the front bearing hole. The greased rear bearing-ball and housing is then carefully screwed home to bear upon the rear of the shaft with just sufficient tension that the shaft rotates smoothly without end-play, yet remains in any set position. Nip up the lock nut. Hold the capacitor up to an even source of light and observe that the plates remain evenly spaced and do not touch at any point throughout the rotor's travel. Replace the wiper(s), re-soldering where applicable.

The replacement mounting feet, visible in Photos 1 and 4 were made from 20 mm x 30 mm L-section angle aluminium off-cuts. The long part of the L forms the upright component, which is attached to the frame, thus allowing for the full swing of the rotor.

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How I became a Ham

Hayden Honeywood VK7HAY,
279 Bakers Creek Road,
Lucaston 7109 Tasmania
Age: 13 years old

I thought I would write this little article to show new novice or future Hams "What it is like"

Hello from VK7HAY,

I am writing this article about how I got my Ham licence and what is going on with my rig and antenna.

I went for my exam in June this year. I went for Novice-Limited and I passed it the first time, thanks to the Radio and Electronics School Novice disks. I got my callsign VK7HAY on 8th July. My two uncles have been helping me through the exam, all the way to now. I bought my first rig from the website vkham.com. I got an HF Yaesu FT-757GX with scanning microphone. I went straight to work setting up my first antenna which was a 21 MHz inverted 'V' dipole.

First I set it up basically on the balcony of my grandparents' home and only received because I had not yet got an SWR meter. I got a pretty good signal on 21.295 MHz upper side band from Queensland at around 59 + 5 db. I have a picture of my antenna at right.

Then I got my SWR meter and tried to transmit but my SWR was way too high so I checked all my plugs and connections but I still could not get that SWR down. I made a home brew Dummy Load to see where the problems were coming from. Then the Dummy Load broke down and wouldn't work. So I decided to stick with receiving and wait until I could get a whip for 80 metres. I am still waiting to get my whip and my 21 MHz antenna is still not working properly, despite hard testing and reconnecting of plugs. I thought I would write this little article to show new Novice or future Hams "What it is like" when you pass the easiest part of the process (which I think is the exam). Anyway good luck with your antennas and rigs, plus SWR tuning and I say,

73, from VK7HAY

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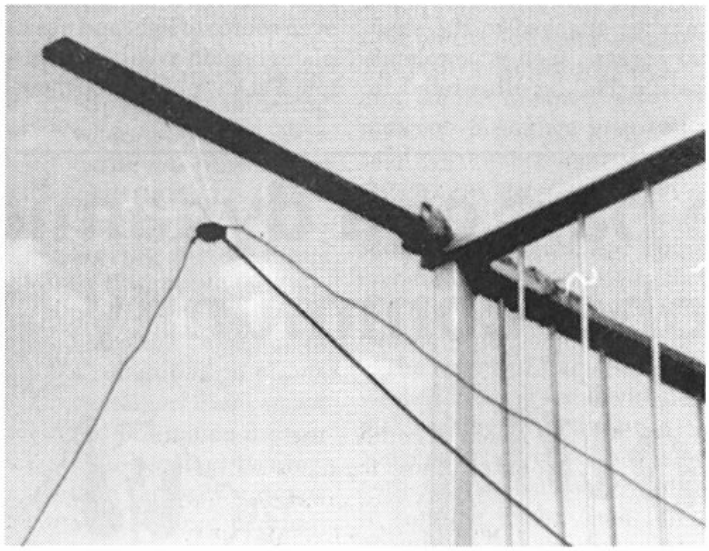
VK7HAY with his rig



21 MHz dipole

Wireless Institute of Australia

Remembrance Day Amateur Radio Contest

—10 August 2004

Address by

General Peter Cosgrove, AC MC

Chief of the Defence Force

"I am honoured to have been asked by the Wireless Institute of Australia to launch this year's Remembrance Day Contest, a contest that perpetuates the names of those 26 radio amateurs who lost their lives in the service of our country during the Second World War.

This weekend marks the 59th anniversary since World War II hostilities ceased in the south-west Pacific area.

The Australian Defence Force remains indebted to those amateur radio operators who served their country in times of war and peace in the skies, the deserts, the oceans and the jungles.

The amateur radio service also has a long and proud tradition of supporting the community in times of natural disaster.

From the Black Friday bush fires of 1939, to Cyclone Tracy, the Ash Wednesday disaster of 1983, the Newcastle earthquake of 1989 and the recent Victorian bush fires, radio amateurs have volunteered their expertise, time and equipment to provide vital communication links for emergency services.

Amateur radio is very much a "hands on" hobby—this provides a unique opportunity for those with a technical bent to experience both the practical and the theoretical aspects of radio and electronics. Amateur radio is thus an invaluable training ground for the military communicators and technicians of tomorrow.

During my career I have seen radio communications develop from hand sent Morse code messages to today's instantaneous information transfers utilising small battery powered radios with ranges of thousands of kilometres.

From my own experiences in East Timor I know full well that effective communications underpin all successful military operations. At one stage we relied on an East Timorese boy with a satellite phone to establish the humanitarian position of a large and isolated East Timorese community.

Communications is a powerful tool for the Australian Defence Force, and we are investing more and more in Network Centric Warfare.

Much of today's technological progress stems from the enthusiastic assistance of amateur radio operators. It is fitting that we remember with gratitude the sacrifice of those radio operators who gave their lives or were wounded as a result of their war service.

During the Iraq war last year, our first 'battle' was to obtain satellite bandwidth. We needed enough into and out of the Gulf to be able to pass quick, accurate, high-density data 24-hours a day. The bandwidth enabled us to network our Command and Control system from the strategic, through the operational to the senior tactical level

Further, as part of the Maritime Interception Force, our Navy made extensive use of a Naval intra-net, chat rooms from ship to ship, to facilitate operations between the coalition, and our people employed a wide-range of information sources where seconds counted to identify transgressors and maintain the blockade. The networking of information was vital in preventing the Iraqi's from releasing mines into the Gulf in the first days of the war.

It's amazing to contrast this technology with that of the Second World War.

Indeed, much of today's technological progress stems from the enthusiastic assistance of amateur radio operators. It is fitting that we remember with gratitude the sacrifice of those radio operators who gave their lives or were wounded as a result of their war service.

I wish you all good luck in the contest. "

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Technical abstracts

Peter Gibson VK3AZL

A useful audio level indicator

In the Technical Abstracts section in last month's Amateur Radio, we published a description of several ways to connect computer sound cards to radio equipment, primarily to allow access to digital modes. It was noted that setting and maintaining the correct input signal levels is important in achieving correct operation. The original RadCom article referred to a previous article describing a simple level indicator. This is it.

In RadCom for March 2004, Danny Dancy, G3JRD describes a simple bar graph audio level meter that allows the levels to be set and monitored as required.

As mentioned above and elsewhere, many of the digital and weather satellite modes that use computers to process the information, require the input levels to be maintained within a narrow range to allow the interface circuits to operate correctly.

The circuit shown in Figure 1 is quite simple and straight forward. The audio signal is applied to the inverting input of the 741 op-amp. The output is rectified and integrated before feeding the input of the LM3914 bargraph display driver. This device drives 10 LEDs, arranged as either 10 discrete LEDs or a 10 segment bar.

The original circuit is constructed on a piece of stripboard and can be powered from any split source delivering +10/-10 volt. This supply should be regulated for the two devices. It does not need to be regulated for the LED supply, but it is probably easier to use the same supply for all as per the circuit.

It would be possible to use a sensitive moving coil meter in place of the bargraph, but the bargraph is probably cheaper if you don't already have a meter in the junkbox, and it is definitely more robust.

As the circuit is shown, it should work when turned on and needs no setting up. Such a piece of equipment should have many uses around the shack beyond its initial purpose.

Editor's note

Whilst the circuit is simple and will perform well, there are a number of changes that could be made to increase its versatility.

If it is required to calibrate to bargraph to a specific level, this can be achieved by varying the gain of the 741 by varying the value of the 390k feedback resistor. Alternatively, the reference level of the LM3914 can be varied (see data sheets referred to below)

The LM3914 is one of a family of devices, each with different level measuring characteristics. The LM3914 is linear, with a constant voltage step between each displayed level. The LM3915 has a logarithmic response with 3 dB between each displayed level, for a full range of 30 dB. The LM3916 has a VU characteristic with uneven steps to mimic a VU meter display. For further information on all of these devices, have a look at the National web site at (www.national.com) and enter the part number in the search box.

One other useful idea is to use different coloured LEDs in the display. One commonly available 10 segment, bargraph has 7 green LEDs at the bottom and three red LEDs at the top. With adjustable gain, the normal operating level can be set to the top green on the display. If red is seen, you are starting to overdrive the system. The colour difference allows problems to be seen from a distance.

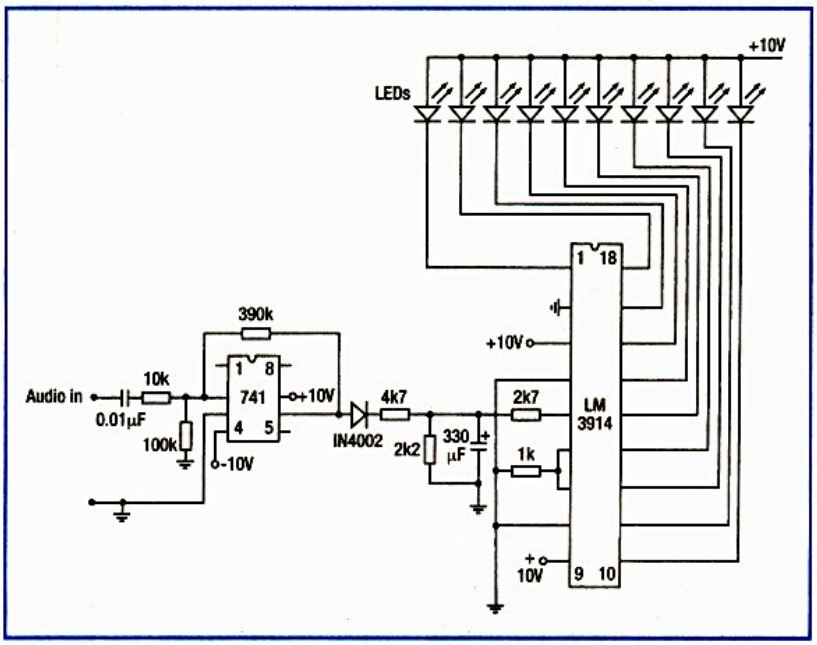

Figure 1 – The level indicator circuit

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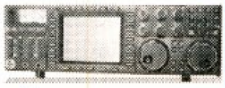

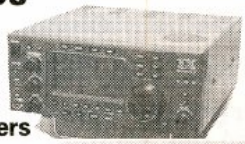

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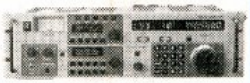

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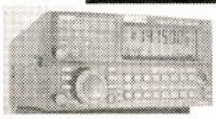

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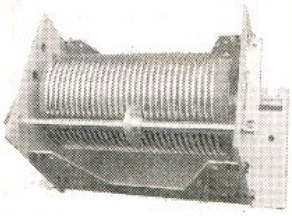

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WIA news

Education task force appointed

On 10 September 2004, WIA President, Michael Owen, VK3KI, announced that he had appointed a task force to address the issue of amateur radio and schools.

There is no doubt that there is a shortage of trained radio technicians, and this coupled with the changes to the Australian licensing structure presented an opportunity to swell the ranks of radio amateurs, particularly with younger people.

The group initially comprises Ron Smith, VK4AGS, a lecturer at Central Queensland University, Brian Clarke, VK2GCE, an education consultant, Lee De Vries, VK3PK, of the Gordon Institute of TAFE at Geelong, and Dave Godfrey, VK3AZX, a former Technical School principal, who would initially act as coordinator of the group.

WIA Board requests ACA make Amateur primary in the 160-metre band

Following a review of Australian Spectrum Plan the WIA board has requested that the ACA change the status of the amateur service in the band 1825 - 1875KHz from secondary to primary status. The primary service in this band is currently Radio Navigation Aids and since there are no longer any of these devices operating in Australia the board is hopeful that the ACA should make the change as requested.

ACA launches first spectrum management strategy for Australia

The ACA held a seminar to release its spectrum management strategy for Australia in Melbourne on 19 August 2004. David Wardlaw, VK3ADW, represented the WIA at the seminar. A copy of David's report to the WIA board and other information, including links to the ACA's media release and its spectrum management strategy and the possible implications for the future for the amateur service can be found on the WIA's web site.

WIA submission – 5.8 GHz band

The WIA has made a submission to the ACA in response to its inquiry into proposed licensing arrangements for regional/rural broadband wireless services in the 5.8 GHz band.

In addition to addressing the particular requirements of the amateur and amateur satellite service in this band, the WIA also said that it is anxious to conduct more general discussions with the ACA on the issue of more secure amateur access to those small segments within shared bands that are of prime importance to the amateur service.

WIA hosts successful NSW clubs meeting

The WIA conducted a conference of NSW clubs on Saturday, 4 September 2004.

Representatives of 8 NSW clubs (Canberra, Blue Mountains, Waverley, St George, Illawarra, Liverpool, Goulburn and Hornsby) as well as the Tasmanian branches met at the Kyle Bay Scout Hall at Connells Point at a meeting chaired by WIA director, Ted Thrift, VK2ARA.

WIA President Michael Owen, VK3KI, opened the conference, outlining the first 100 days of the national WIA and stressing the importance of the role of the clubs to the future of amateur radio, and that the purpose of the meeting was to find out what the clubs saw as important to assist them, to guide the WIA in developing its relationship with the clubs.

Two workshops were established, one identifying means by which the clubs can assist the WIA and the other identifying the services that the WIA could offer to assist the clubs.

In closing the all day conference, Alan Hawes, VK1WX, referred to the value of the conference, thanking the WIA for arranging the meeting, and Ted Thrift acknowledged the constructive and enthusiastic support of all who attended.

Queensland votes to wind up and transfer assets

On 24 August 2004, at a special meeting of the Queensland Division, it was decided by two separate resolutions, to wind up the Division and to pass the Division's assets to the WIA. The first resolution was adopted 150 votes in favour, 1 against, and the second resolution was adopted 151 in favour and 1 against.

"The magnificent margin in these votes reflects the strong view of Queensland members that the future is with the national WIA and that there is no point in trying to retain the structures of the past," said Chairman of the meeting Ewan Mcleod VK4ERM, President of the Queensland Divisional Council (WIAQ).

VK7 signs Implementation Agreement

It was announced late August that the Council of the Tasmanian Division had signed the Implementation Agreement, the agreement that formalises the position between the WIA and the former Divisions, a further step in the creation of a single, national WIA.

The Council has called an extraordinary general meeting of the division to be held at 2 PM on September 19 at the Ross Hotel, Ross. The council is recommending that the division be wound up and the current branches become radio clubs.

More information on each of these items, and other items, may be found on the WIA's web site www.wia.org.au. The site is regularly updated with current news and other information of interest to radio amateurs.

New members joining the National WIA grows

After three months of operation as the national WIA, the number of new members is growing by around 25% when compared with membership growth last year. It is still too early to determine if the number of members renewing is different from last year, though no alarming trend has been detected.

ar

VK1 news

CRARC Forward Bias

Peter Kloppenburg VK1CPK

Membership of the Canberra Region Amateur Radio Club (CRARC) is slowly increasing. However, members of the WIA ACT Division are considered members of CRARC until their WIA membership is up for renewal. They will then have a choice of remaining a member of the WIA and/or joining CRARC. This process is obviously going to take some time because some WIA members are not due for renewal until 31 July 2005. In the meantime, there is nothing to stop anyone from becoming a CRARC member now. Membership of CRARC is $20 per year. Membership applications are available from our Website at: www.vk1.wia.ampr.org or at the general meetings of CRARC.

During the October general meeting, there will be a proposal to re-establish an 80-metre club net. Several members have asked for this to be organised. Alan Hawes, our president, will conduct a straw poll on this subject to determine support for it. Setting up a successful club net requires volunteers to run it. Are you interested? No pre-conditions have been set yet, but it will be necessary to select a suitable frequency, time of operation, net duration, transmitted power level, and type of antenna used by the net controller and net participants, as well as program subjects.

CRARC is in the process of revamping the VK1 Award system, as all the certificates now carry the wrong club name, logo, and landmark display. However, as before, there will be a time period after the Club Net finishes when VK1 Award seekers will have an opportunity to make contact with ACT based radio amateurs to accumulate points towards the award or upgrades. The newly appointed Award Manager is Colin Holmes-Clarke, VK1ZHC.

To establish efficient management practices, Alan Hawes has allocated portfolios/tasks to the following committee members: Alan Hawes, VK1WX-Broadcast/E-mail News, Russell Manning, VK1JRM-General Meetings and Guest Speakers, Graeme Wilson, VK1FXL-Education, John Woolner, VK1ET-JOTA Coordinator, Gilbert Hughes, VK1GH-ACT Technical Advisory Committee (ATAC) Liaison, Philip Longworth, VK1ZPL-WICEN ACT State Coordinator.

An important event this month is the Jamboree Of The Air (JOTA). The Scouts & Guides organisation in the ACT will activate two stations, VK1HS, VK1SAA. The call sign of the national association is VK1BP. The purpose of JOTA is to bring Scouts & Guides together through radio, in addition to the 4-yearly summer camps. This year, the event is number 47 since the world jamboree in 1957. There are several ways Radio Amateurs in the Canberra region can help to introduce the world of amateur radio to Scouts & Guides. You can have an open house for them during the weekend of 16-17 October, calling CQ Jamboree, or volunteer as an operator at one of the base stations in the Canberra region. Apart from using local repeaters, calling frequencies are as follows: 3.590 – 7.090 – 14.190 – 21.190 – 28.590 MHz. The Scout's Website for the ACT is: www.act.scouts.asn.au/actscouts.

The next general meeting will be held on 25 October 2004, at 8 pm in the Scout Hall, Longerenong St., Farrer. Cheers.

VK6 news

Compiled by Will McGhie VK6UU
Input to:
will2@iinet.net.au
08 9291 7165

Apologies for no September VK6 notes but the best snow ever on the east coast caused the problem, just had to go skiing.

Closest vote

The August Special General meeting was held to decide several issues, the most important being the winding up of the VK6 division. Sixty-four members attended the Special General Meeting. This was quite a good turn out. Numbers like this have not been seen since the heady days when meetings were held at Science House. By the way does anyone have any photographs taken at Science House during those meetings?

In a very close vote, the motion was defeated by the narrowest of margins. The vote was 74.6% for winding up, and 25.4% against. The motion to wind up the VK6 division was lost, as a 75% majority is required to wind up the Division. The second motion to dispense with all of our funds was not required. The third motion, to write up a new Constitution, hold another Special General Meeting to accept the new Constitution and donate most of our funds to other VK6 clubs, was passed. A small amount of money is to be retained by the division to maintain our operation.

Just how the division will function is to be seen. The primary concern expressed by some members was the uncertainty as to how the new National structure will perform. No one can

Ballot mail out

State news

Special General Meeting

predict with any certainty what the future is. Burning our bridges could prove to be a mistake.

The September Council meeting discussed the way ahead, the finalisation of our funds, the change of our name, and the revision of the Constitution. At the October meeting we should be fixing the date for another Special General Meeting to accept the new Constitution etc. This is expected to be in December.

The accompanying photographs show the VK6 Council sitting around the council table putting together the mail out to all members, and the members at the Special General Meeting during the all-important voting.

WICEN WA Notes

Motor sports in the form of car rallying provide regular and important exercises for WICEN WA. WICEN team members provide "SOS" (Safety on Stage) communications using commercial equipment and frequencies, backed up by amateur 2 m equipment and frequencies.

Most recent events were the "Experts Cup" held on 17th July near Collie where five operators were utilized and the "Stirling Stages" held on 18th September with four operators involved, near Stirling Dam east of Harvey in the forest areas.

The "City to Surf Fun Run" is another event which WICEN WA supports and has done for many years providing communication links for the event organizers. This year's event was held on the 29th August and utilized 2 m amateur equipment and frequencies. The WICEN repeater was used for this local event with eight stations involved including one mobile station following the runners.

Planning is in progress for the TELSTRA Rally Australia, with WICEN members providing some of the "SOS" communication links. This event is over three days in November. Since this event is an international event all operators need to have CAMS accreditation for the "Safety on Stage" activities they are involved in.

From a recent request to all WA amateurs by WICEN WA to have their station recorded as a volunteer in case of an emergency, several amateurs have returned their completed form. If you have not completed a form and still wish to be part of this Emergency Network, a form may be downloaded from the WIA VK6 website and returned to Rob VK6PO or Jim VK6JP.

WICEN WA may be contacted by email to vk6wicen@wia.org.au or jimmaree@webace.com.au and information is on the website at http://members.iinet.net.au/~vk6wia/c-wicen.html

If you are not on the Internet, check out the WICEN Net, Wednesday evenings on 80 metre 3.600 MHz at 20.00 hours local time, 8.00 pm + - QRM and 146.750 or 146.700 at 8.30 pm Note: If the frequencies are busy at net time Jim will move, the last being to the local WICEN Repeater on 146.875.

Thanks to Christine VK6ZLZ and Rob VK6PO for their input to October VK6 notes.

VK7 News

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au
Regional Web Site: www.wia.org.au/vk7

Final Divisional News

On Monday the 23rd of August, VK7 signed the implementation agreement, thus bringing VK7 closer to the one National WIA. The agreement can be summarised by describing the undertakings given on each side. The Tasmanian Division encourages its members to join the National WIA, and will take certain steps to wind up the Division and properly transfer Divisional assets. The National WIA will, on advice from the Tasmanian Advisory Committee, appoint a WICEN co-ordinator and a repeater co-ordinator, contribute to maintenance of the repeater network and beacons for at least 5 years subject to limits, continue the Tasmanian Devil Award and consider any applications for grants of financial assistance subject to terms. The special general meeting was held on 19 September 2004 to deal with the formalities of transfer and closing down the Division.

The Tasmanian Advisory Committee membership has been confirmed by the National WIA. This Committee will advise the National Board on matters that are applicable to the Tasmanian Region, as well as acting as a conduit to National administration. The initial committee is for 3 years and then after that elections will be held. The first VK7 Advisory committee is:

Phil Corby - VK7AX	philipc@tassie.net.au (Chair)
Dale Barnes - VK7 DG	vk7dg@wia.org.au
Reg Emmett - VK7KK	regemm@ozemail.com.au
Allen Burke - VK7AN	allen.burke@bigpond.com
Martin Luther - VK7GN	vk7gn@bigpond.com
Ron Churcher - VK7RN	churcher@keypoint.com.au
Justin Giles-Clark - VK7TW	vk7tw@wia.org.au

Regional Broadcast Changes

The last meeting of the Divisional Council on 14 August 2004 resolved that the WIA National Broadcast would be played at 0900 throughout VK7 and the VK7 Regional News broadcast would follow at 0930. The Divisional Broadcast Officer role has become the VK7 Regional News and Broadcast Coordinator, thus providing continuity and maintaining an official channel between the WIA National News team and the VK7 Regional Broadcast Team (currently numbering 22!). The new arrangements started on August 29.

Tasmanian Hamfest 2004

As reported last month, the Central Highlands Amateur Radio Club of Tasmania (CHARCT) in conjunction with the WIA (VK7 Division) is holding a major Hamfest at the Central Highlands township of Miena on Saturday December 4 2004. This is building to be the event of the decade and I encourage all VK7 amateurs to attend.

There will be operating displays, stations, CW, ATV, APRS, digital and vendor displays plus several prominent guest speakers.

Starts at 1100 and winds up at 1500. Entry is by gold coin donation. Coffee and tea will be provided and food will be available. See you there.

Northern Tasmania Amateur Radio And Electronics Group

The Northern Branch met on the 11 August 2004 to vote on a new branch identification. It was agreed to call the new group the Northern Tasmanian Amateur Radio and Electronics Club (NTAREC). The meeting was attended by approximately 30 amateurs and they accepted the new unincorporated rules. Allen, VK7AN, President of the Northern Branch thanked all who attended for their positive attitude.

Radio and Electronics Association of Southern Tasmania Inc.

The Southern Branch met on 1 September 2004 and after constructive debate decided to become incorporated and decided on a new name of the Radio and Electronics Association of Southern Tasmania Inc (REAST).

It will be an incorporated body as we have an existing lease and agreement with the Hobart City Council and the Tasmanian Small Marine Radio Group and the feeling of the meeting was that we needed to become a legal entity to ensure continuity of these arrangements and limit any potential liability.

I thanked all involved, especially Phil Corby, VK7ZAX, the executive team and those members who attended, I think we have placed the Southern Branch on a great foundation for the future.

Q5 broadcasts in Southern Tasmania

We thank the Gold Coast Amateur Radio Society for allowing the retransmission of their Q5 education and information hour on Southern repeaters on a Wednesday night at 1930. This broadcast replaces the Experimenter's Nights. Q5 has been running in the North West for the last couple of months. I would like to thank Ken, VK7DY for organising this educative and informative venture.

International Lighthouse/Lightship Weekend

Roger, VK7XRN, Peter, VK7TPE, Steve Sharples and XYL, Rhonda, all members from the WICEN South Team organised to operate the VK7OTC/7 callsign from the Cape Bruny lighthouse during the International Lighthouse/Lightship Weekend and made many contacts and had much fun in the process. The caretaker at Cape Bruny is Andy, VK7WS who helped to setup the two stations. One at the lighthouse keeper's cottage and the other was at the lighthouse itself. Equipment was ICOM IC-706s barefoot into an Off Centre Fed Dipole and longwire.

The erection of the mast was somewhat difficult in the gusting 70 knot, (130 kph) winds and much amusement was expressed by passing Japanese tourist! With guys secured it was down to operating and many contacts were made with other lighthouses around the world including the VK3 expedition to King Island operating VI7CL. A live cross during the Sunday morning VK7 Regional Broadcast was also successful. Roger's advice was it is highly recommended to the "stay at homes" for next year. However, take your lead boots and hang on to those guy ropes!

Cape Bruny lighthouse built 1836, supporting one end of long wire and support crew during the weekend, WICEN member Steve Sharples and his XYL Rhonda. Photo courtesy of Roger, VK7XRN

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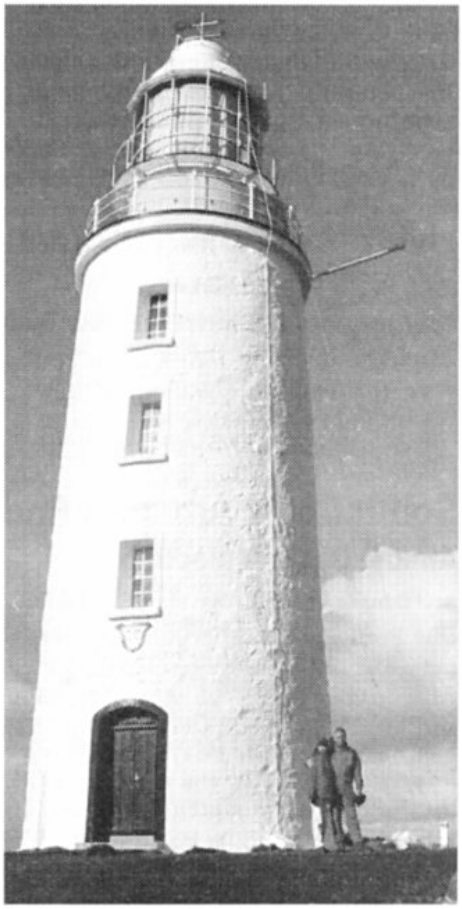

Cape Bruny lighthouse and support crew

Club news

Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

Unhappily this month we also start with an obituary. Long time member of AHARS and the amateur fraternity, Clem Tilbrook, VK5GL became an SK at the age of 92 on 21.8.2004. Twenty or so members of AHARS attended his funeral. A full obituary appears elsewhere in this issue of AR.

At the beginning of the August meeting of AHARS Colwyn Low, Editor of "Amateur Radio" presented a certificate to Lloyd Butler, VK5BR in recognition of the number and interest of the technical articles about aerials Lloyd has written for AR in 2002 year. Lloyd almost missed out on the presentation because he wasn't watching the clock, but he arrived in the nick of time. A photograph of the award and further details will appear in November *Amateur Radio*. Congratulations Lloyd!

This meeting of AHARS was addressed by Robin de Vore VK5ATT, previously resident in the USA, discussing the differences between the amateur radio world in the US and in Australia. While some of the differences were known, there were some new variations, all of it of interest to the members.

Then he went on to discuss the civil emergency situations 'over there' which are very different from those 'down under'. There are many more emergency events in which the aid of the amateurs as communicators between the various emergency agencies is valued, therefore they are much valued by the authorities. There are basically two civil emergency radio networks which can operate separately or in unison to deal with each event as it arises.

Robin and his YL, Carol VK5KEY (ex VK YL) were both deeply involved in a raging forest fire not far from their home, not long before they came out to Australia which he could describe in detail.

Altogether it was a very interesting talk.

It is clear that WICEN would have a higher profile with the authorities if Australia had more civil emergencies, We would not wish on our citizens tornadoes, flood, cyclones or wildfires like those experienced in the US, (let alone a 9/11). There has to be a better way to let our leaders know how useful we can be.

Fleurieu Radio Group

Christine Taylor VK5CTY

Another very pleasant luncheon of this group was attended by sixteen of us at Goolwa, on the Fleurieu Peninsula.

During the luncheon a card was passed around the table to be signed by all those there, to send good wishes to Frank VK5FJ who started this group up five or six years ago. After the luncheon, Noel VK5VT, a long time friend of Frank and his XYL Marilyn, volunteered to take the card to Frank at the nursing home.

Unfortunately, when Noel got back to Adelaide he found a message on his answering machine to tell him that Frank had become an SK shortly after he left.

Saddened by the news we were glad we had sent the card to Frank and that he had had time to read it. Until just a few months ago Frank and Marilyn regularly went ballroom dancing, though they were both well into their 80s.

Liverpool & District Amateur Radio Club

Garry Barker VK2TSR Hon sec

The Liverpool & District Amateur Radio Club will be holding an Auction on Saturday 6th November

The location: Scout Hall Hoxton Park Road, Hoxton Park, which is next to the Hoxton Park Shopping Centre

The auctioneer will commence the auction at 1100 and a Sausage Sizzle will be available

So if you have have any unwanted gear, bring it along and convert it to cash.

Any enquiries, contact the secretary Garry VK2TSR on 02 9896 5763 (evenings)

South Coast Amateur Radio Club Inc.

Annual General Meeting

Stef Daniels VK5HSX, Secretary SCARC Inc.

Due to the change after a motion was passed at the General Meeting held Wed 24th March 2004, the club's Annual General Meeting will from now on be held on the 4th Wednesday in November each year. This year the meeting will be held at the SCARC Clubrooms – Karawatha Community Hall – 12 Baden Tce, O'Sullivan Beach. SA, commencing at 8:00pm on 24th November 2004, so please arrive 15 minutes early to allow prompt start.

At the AGM all positions become vacant and open for election. Nominations will be taken either on the night, in writing or by an attending proxy for voting by election. Positions include: Chairman, Secretary, Treasurer, Committee Member #1, #2, #3 & #4.

Members are asked to attend, with guests and visitors more than welcome. Apologies can be sent to the Secretary, Stef Daniels VK5HSX by either mobile 0417 821 747 or email: secretary@scarc.org.au . More information can be obtain by visiting the SCARC website located at www.scarc.org.au .

Look forward to seeing you there and why not support the club and consider standing for a position on the 2004/5 Committee.

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Trap aerial design

Lindsay Lawless VK3ANJ

A multi band aerial using "rejector circuit" traps is an easily constructed aerial, and popular for that reason, it is also easily designed for purposes other than the popular "recipes". The following technical analysis of the W3DZZ 80/70 version illustrates the basics and provides the clues necessary to design other applications of the idea.

The W3DZZ construction detail is included in all editions of the ARRL Antenna Book, readers are referred to that publication for construction detail. Using the following technical information a design from scratch is within the capabilities of licensed amateurs and is worth attempting.

Referring to a construction diagram of the W3DZZ, the components are :

(a) a centre section half wave dipole for 7.2 MHz (length 21 metre),

(b) two parallel LC circuits at the centre section ends (fr = 7.175 MHz) (8.2 µH and 60 pf)

(c) two equal length tails .

The inductance of the three elements is chosen so that the total inductance equals the inductance of a half wave dipole resonant at 3.6 MHz.

Assuming the system uses 3mm wire elements the wire inductance is 1.98 µH per metre [appendix (b)], therefore the total inductance must equal that of a half wave at 80 ie length 42 metre and inductance 83 µH. The inductance of the 40 metre centre section (21 metre) is 41 µH leaving 42 µH to be provided by the traps and the tails.

Using the appendix (a) equation the reactance of each trap at 3.6 MHz is +j247 ohm equivalent to an inductance of 10.9 µH; each tail to supply the rest of the inductance (21uH) must be 5.3 metre long (10.5 µH each). The tails on the W3DZZ version are 6.8 metre each.

The version installed at VK3ANJ is an inverted VEE dipole, operating on 80 and 40 metres. Construction is almost identical with the W3DZZ design but satisfactory operation without an ATU is only possible on 80 and 40 where the SWR = 2 points are at 3.5 and 3.675 MHz and at 7.0 and 7.3 MHz.

Appendices:

(a) Trap reactance $X = \frac{j[2\pi fL]}{1-(2\pi f)^2LC}$ ohm

(b) Wire inductance L =0.2S[(Ln 4S/d) - 1] µH

S = wire length in metre; d is wire diameter in metre.

Construction reference ARRL Antenna Book 18th edition chap. 7.10 et.al.

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ALARA

Christine Taylor VK5CTY

The Contest

This year's Contest was a great success. The propagation was kind, especially on 80-metre, there were plenty of operators and, with some specific frequencies and times previously arranged DX was much better than usual, too. Now all that is required is that you all put your logs in for Marilyn VK3DMS to check.

She will be delighted to get all the logs, YLs, OMs and all. Please send them to the address in the July "Amateur Radio", to Marilyn VK3DMS QTHR the callbook or by email to alaracontest@wia.org.au ASAP. Plain text, MS Word or MS Excel may be used. Full rules were in April AR. Please do not send your original log, make a nice clean copy of it and keep the original for yourself.

Congratulations – BYLARA turns 25

British Young Ladies Amateur Radio Association (BYLARA) is 25 years old this year and although there was little response to our question of how we should celebrate, the committee thought it would be nice to have some mementos, so this Newsletter has some of the milestones from the last 24 years.

BYLARA started in April 1979 with Subs at 1.50. Mary Adams, G4GAJ, was Chairman and Editor, Diana Hughes, G4EZI, Secretary and Judith Brookes, G41AQ, Treasurer.

The first Newsletter was printed in June 1979. There were 123 members including OMs and overseas and the Newsletter was being sent to America, Australia, Africa, India and Europe.

These were some of the YL clubs at that time: YLRL Young Ladies Radio League (America), JLRS Japanese Ladies Radio Society, YLRC Elettra Marconi (Italian Ladies), CLARA Canadian Ladies Amateur Radio Association, ALARA Australian Ladies Amateur, Radio Association PARKA Polar Amateur Radio Klub of Alaska (mixed club), WARO Women Amateur Radio Operators (New Zealand), DLYL German Young Ladies, SAWRC South African Women's Radio Club.

Some highlights of the 25 years:

(Copied from the BYLARA newsletter)

- *January 1980 we were affiliated to the RSGB and the DXYL net, the 14.222 also started.*
- *1981 we had Associate Members in Germany, America, Luxemburg, Denmark, Holland, Libya, Poland, Canada, Australia, Bermuda, South Africa, New Zealand, India, Alaska and Indonesia.*
- *September 1982 Subs were E2.00, members were taking part in Special events, Contests, DXpeditions, Overseas YL Meets and visits to friends made over the air.*
- *February 1983 Angelika Voss, GOCCI, became Newsletter Editor.*
- *March 1984 Subs E2.50. The First BYLARA Contest started and it continued until 1998 when it ceased due to lack of support. The 5th Birthday Party was held at Elvaston Castle.*
- *1987 Subs E3.00. Maureen Fellows, G8GKR, and Edward Fellows, G8ENA, took over the printing and distribution of the Newsletter.*
- *1988 At the AGM a new constitution was presented and approved to allow for postal voting because of the decline in attendance at rallies.*
- *May 1989 the 10th Birthday Party was held at Drayton Manor. This appears to have been the last large gathering.*
- *1990 Subs E3.50. Kay Ayres, GØKTC, became Newsletter Editor.*
- *August 1998 we had our own call sign MØBYL.*
- *2000 BYLARA's 21st Birthday. The special call GB2YL was used by Jan, GWØKPD, and Maureen, GØVRT.*
- *Maureen, GØVRT, and several other members activated Les Minqueries off the coast of Jersey for Islands On The Air with the Special call GJ4L.*
- *2003 Daphne Neal, G7ENA, became Newsletter Editor.*

You never know to whom you are talking!

The elderly grey haired lady looked around the Electronics Shop. She found what she was looking for, a shortwave radio for her Grandson. It was worthy of note that most of the radios only had the normal AM and FM coverage, very few had shortwave!.

As she looked around a young salesman sidled up to her. "Can I help you Ma'am" he said. He gave her that supercilious look that the young, who believe they know it all, sometimes give their elders.

"How much is this radio? I can't read the small print of the price"

"$250", said the salesman, looking past her at some new young customers eyeing a big TV costing four times as much as the radio. Turning the radio over she looked at the specification label on the back.

"Do you have any other shortwave radios"?

The young salesman looked up at the ceiling and said. "This set has superhetrodyne", watching to see if this announcement had any affect on the elderly purchaser! As she looked at him he said, "and band spread".

"Is that so?" she said. "What does that mean?"

If the smart (he thought) young salesman had been paying more attention to his elderly customer, instead of watching the other customers he would have noticed the mischievous look in those blue eyes behind bifocal spectacles.

"The latest in modern technology, to give you the best reception anywhere at any time!"

"Yes, but what does it do?" she asked.

The young salesman let out a long sigh.

"Do you want the radio or not? I have other customers to attend to", as he took the radio from her hands.

"I'll think about it, and ask about this super thing!" she said as she headed towards the door.

She felt sorry for the young whippersnapper salesman. How was he to know that she had learned about superhetrodyne receivers before he was even born? It was naughty of her to have ribbed him, but she could not help herself. It was his attitude that triggered her devilish mood. She smiled to herself as she headed home. Golly gosh, look at the time. She had to be home to run her AOCP classes. After that she was controller of the ALARA 80 m Net.

As she stood in front of the AOCP students a short time later, she said, "I think we will discuss superhetrodyne receivers today!"

The full story of the DXpedition to Christmas and the Cocos Keeling Islands

VK9XYL and VK9CYL

Gwen VK3DYL

Christmas Island, the peak of an ancient volcano 360 km south of Indonesia and 1400 km north west of mainland Australia, was the first stop for the all-YL DXpedition consisting of Gwen VK3DYI, June VK4SJ and Elizabeth VE7YL last October. It was born 60 million years ago from a volcanic eruption. Shaped like a Scotch Terrier it is approximately 135 km^2. The interior, a National Park, is covered by rainforest. Phosphate mining operation is carried out elsewhere.

The island is known as the "Kingdom of the Crabs". Crabs march from the rain-forested slopes down to the ocean to breed at the beginning of the wet season, generally late November, then return to their burrows for the rest of the year. I believe that at those times it is very difficult to walk anywhere without stepping on a crab, let alone drive on the roads or play golf. Special tunnels have been constructed under some roads to enable the crabs to cross safely. We managed to see quite a few red crabs in the forest, plus the larger robber crabs and the pretty blue fresh water crabs, but were too early for the migration.

There was a lot of bird life as well as great scenery. In fact the only thing the island lacked for us YLs was good propagation to other parts of the world! I'm not sure why it is that whenever we three go on a DXpedition we either break the local drought or cause propagation to dive into a black hole. It was very hot and humid – thank goodness for air-conditioning. At that time there were 51 "boat people" still on the island while the Australian Navy, in the form of HMS Stuart, hovered offshore watching over us like a mother hen.

Our balcony provided us with glorious views of the setting sun while small fishing boats returned to shore each night with their day's catch. We even saw a large pod of dolphins, and met up with a few divers who had come to the island to enjoy the world-famous reef and cave diving. We confined our swimming to the motel's own pool.

We didn't make as many contacts as we'd hoped for (only 4,400) and more than half of those were into Japan; North America and Europe were hidden behind the high hump in the centre of the island. After 2 weeks we packed up our gear (a TS50, an F7100D, Elizabeth's Morse key and a set of the VK3GKK dipoles) and flew off to Cocos (Keeling) Islands with high hopes for better propagation. But "Murphy" came with us.

Cocos (Keeling) Islands, one of Australia's most remote external Territories, are 900 km west of Christmas Island, just an hour's flight away. The islands (a group of 27 coral atolls) were discovered by Captain William Keeling in 1609 but were not settled for a further 200 years. In 1827 Captain John Cluniés-Ross arrived with his family, planting out coconut palms and trading in coconuts, coconut oil and copra. In 1978 the Australian Government purchased the Clunies-Ross interests and in 1984 the Cocos community chose to integrate with Australia.

The first settlers brought to the islands were predominately Malay Muslim and today, after eight generations, the existing society (most of whom live on Home Island) is deeply committed to the Islamic religion with their own mosques, leaders and ceremonies. We arrived on the first day of Ramadan; hence all the Muslim-run restaurants were closed.

In 1836 Charles Darwin visited the islands aboard HMS Beagle and formed his theory on atoll formation; in 1914 the German light cruiser SMS Emden was scuttled on North Keeling following its encounter with HMAS Sydney, and in 1944 West Island was home to more than 7,000 troops from Britain, Canada, Australia and India, while an airstrip was built. This airstrip (which runs down the centre of the golf course!) is still in use. When the twice-weekly plane is due, the runway lights come on, a man in a jeep drives madly up and down the strip to make sure there are no obstructions, sirens sound and the local population lines the perimeter fence to welcome visitors and returning friends and family.

We had three nice units, Cocas Cottages, facing the runway/golfcourse, with suitable coconut palms for attaching dipoles to. Unfortunately we hadn't allowed for a coconut falling on June's Buddypole antenna nor for the largest explosion ever recorded in our solar system which shut down propagation for a few days. In our two weeks' stay, after a lot of hard work calling on dead bands, we were lucky to make 3,500 contacts, a sad contrast to our preceding German group's 19,000 contacts. Still, they had good conditions, beams and amplifiers.

However, one Stateside guy seemed a little flabbergasted when he told Elizabeth he was running 1,500 watts into a 6 element 10m beam and she answered we were running 100 watts into a dipole strung between a coconut palm and our unit! . It was nice to live in shorts, T-shirts, sunscreen and insect repellent for a couple of weeks. Daytime temperatures were around 30°C but the southeast trade winds cooled things down morning and night. The coral atolls offer world-class snorkelling and diving while a few beaches are great for family swimming and barbecues. The sunsets aren't bad either! The roads are well maintained but driving hazards consist of dodging fallen coconuts, crabs (brown ones this time) and the many feral chooks which roam the island.

Some photos of our trip can be seen on my web page under the icons for 2003 (well, when my son finishes putting them on!). www.qsl.net/vk3dyl

International YL Meet in Seoul

By the time this magazine is on the newsstands there will be nearly 100 YLs assembled in Seoul for this year's International Meet. We wish then well, and hope to hear some reports from the VK-YL representatives.

33 to everyone there.

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AMSAT

Bill Magnusson VK3JT

Echo latest

Echo (AO-51) continues to excite the interest of newcomers and old timers alike.

The satellite is available for users and has been tested in a number of different modes. The control stations are still doing the required checks to complete the commissioning and so far everything seems to be in order.

Experimenter's days have provided the opportunity for AO-40 devotees to dust off their gear and try out their 2.4 GHz down links using the V/S and L/S FM repeater modes, both of which use 2.4 GHz down links.

Remember however that AO-51 is a LEO (low-earth-orbiter) unlike AO-40. Those who do not have automated antenna tracking and automated receiver tuning for Doppler correction may have trouble keeping up with antenna aiming and receiver/transmitter tuning and making contacts all at once. "S"-band is a different kettle of fish to 10 m, 2 m and even 70 cm when it comes to handling Doppler correction. It's a real challenge but the rewards are strong signals, very low noise and excellent QSOs.

The 2.4 GHz signal is reported as being strong enough that a short helix should do the trick and a dish may not be necessary. Operators report some fading when AO-51 is at low elevations. One station told of making contacts via AO-51 using only the dual band patch antenna from his dish hand-held without the dish.

If you want to plan your station or check your existing gear against a known standard, Terry Osborne ZL2BAC has provided a link budget calculator for Echo V/U mode. It's on the Echo Project Page section of the AMSAT website in the FAQ section. http://www.amsat.org/amsat-new/echo/Echo_Linkbudget.php will get you straight there.

The AMSAT group in Australia.

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an e-mail mailing list for breaking news and such things as software releases. Contact Graham if you wish to be placed on the mailing list.

AMSAT-Australia Echolink Net.

The net meets formally on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join in and take part. Graham VK5AGR acts as net controller. The net starts at 0600 UTC and you can join in by connecting to the AMSAT conference server.

All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,
9 Homer Rd,
Clarence Park, SA. 5034

Graham's e-mail address is:
vk5agr@amsat.org

PSK31 tests on Echo using 10 m SSB uplink and 70 cm FM downlink

As part of the testing of all facilities on Echo, the Wednesday Experimenter's day is being used to give PSK31 enthusiasts their first opportunity to try this mode of communication via an amateur radio satellite.

While there have no doubt been individual attempts at using this medium on other satellites, this is the first organised trial to promote PSK31 as an experimental satellite mode. The nature of PSK31 presents difficulties with Doppler tuning correction which will be addressed over a number of experimenter's days.

Peter Martinez, the inventor of PSK31, will be doing some test transmissions to try some ideas for a possible method of solving these problems. The first test will be conducted after the deadline for this edition so I will write a summary of the test results in the November column.

Here is part of Peter's post to the AMSAT bulletin board. "On 14th September, I will be doing some tests transmitting PSK31 up to the AO51 (Echo) satellite on 28 MHz with downlink on 435.3 MHz FM. The object of the experiment is to see if it's possible to use the downlink FM audio (which suffers no downlink Doppler shift or QSB) to control the 28 MHz uplink frequency and power so that the downlink signal will be completely free of Doppler and level variations. To receive these tests you will need an FM receiver with the audio output fed to your PSK31 software. I will aim to transmit so that my signal appears in the downlnk FM audio at exactly 500 Hz. You should be able to simply set the PSK31 receive frequency to 500 Hz and not need to tune around. I will be transmitting a continuous test message. If you hear me, please let me know. I am particularly interested to know how steady the frequency of the signal is, since my system should completely eliminate any uplink Doppler shift, and also how steady is the signal level, since my system should adjust the transmitter power to keep that constant too. If this test works well, I hope on future tests to be able to work two-way QSOs while the uplink is frequency- and power-controlled, but for the first attempts I will just be transmitting-only. If you want to try transmitting PSK31 through AO51 during these experimenter's days, see the AMSAT.ORG website for further information".

The tests will not be audible here of course but the test results should be most interesting. If Peter's ideas are successful it could introduce another mode to the many already enjoyed by satellite enthusiasts.

No resolution yet of "Keps" issue

Dr Tom Kelso who is responsible for the Celestrak web site has been providing a weekly situation update on the AMSAT-BB.

The issue is far from being resolved but there are some encouraging signs.

You can keep up with developments by going to the Celestrak web site where an update panel is being maintained or by watching the AMSAT-BB for the weekly update postings.

This is a very important issue for all satellite enthusiasts whether involved in amateur radio or sky-watching or weather satellite monitoring. The October-1 deadline for closure will be passed by the time you read this. Let's hope for a successful resolution.

Another AO-40 anomaly

It seems there's a possibility that another "event" has taken place on AO-40.

Early in August reports began coming in of a slight but significant change in the Mean Motion of AO-40.

Mean Motion is one of the parameters that we encounter in the form of "Keplerian Elements". The element sets allow us to predict quite accurately where a particular satellite will be at any time and when it will be available for us to hear or make contacts.

The actual number appearing in the Mean Motion field gives the number of revolutions of the Earth that the satellite makes in one day. AO-40's Mean Motion usually runs at around 1.25 whereas LEO satellites do around 14 - 16 revolutions per day.

At first it appeared that only a major "venting" of gas or a motor firing could produce enough thrust to achieve the mean motion change that has been recorded, but as Peter Guelzow, DB2OS and Viktor Kudielka, OE1VKW observed, the data is not conclusive and could be due to 'smoothing' or errors in the NORAD data. Viktor noted, "I am unable to judge which points are just imprecise measurements and what are the influences of data smoothing or other manipulations. Although there are small changes to other parameters like Eccentricity, the only significant effect is the change in Mean Motion".

Peter continues, "If you look carefully at the data, you will see that the 'orbit change' already happened *before* the sudden battery event. We can only speculate, that it is the battery. Perhaps there is also some remaining fuel?" Peter added.

"The (observed) 'thrust' phase is also much longer than the battery event. Perhaps (the whole episode) could be smoothing/manipulation of the NORAD data too. There is room for a lot of speculation."

Peter concluded, "Assuming the S/C mass to be 400 kg, then this change (would require) an impulse of 40 kg m/s or equal to 5 minutes of hot Arcjet firing. I have no idea if the battery is capable of doing this. Indeed, if it is shorted it will get glowing hot and vent everything."

UO-22 experiences more problems

It's been a roller-coaster ride on UO-22 these past few months.

Chris Jackson recently reported "an attitude anomaly" which resulted in a loss of stability of the satellite with accompanying fading of signals as it tumbled.

The down link signal from UO-22 is normally very stable and strong. It uses a simple but effective method of stablisation called a gravity gradient boom. This is a passive method in that it requires no power or control electronics. It has been used on pretty well all UoS satellites from UO-9 onwards. It employs a long telescopic boom which is extended from the 'top' of the satellite frame when safely in orbit. In the early days a passive mass was attached to the top and this, together with the centre of mass of the satellite formed a 3-way couple with the earth's gravitational field. With the satellite spun slowly around it's longitudinal (boom) axis the effect was to lock the satellite into an earth-pointing attitude which it maintained right around the orbit. The antennas were arranged on the 'bottom' of the spacecraft and this meant that they were pointing directly downwards at all times.

Later UoSats have used a remote instrument pod as a 'mass' at the end of the boom, the effect being the same. Something occurred recently to upset this situation on UO-22 and the Surrey control team have been trying to effect a cure.

There have also been several occasions in the past year when the software on UO-22 has played up and a re-load has been necessary. Some battery problems have also been reported and at present UO-22 is open for users but is only available when in sunlight. It speaks volumes for the designers and builders that these quite critical situations can be addressed and overcome.

UO-22 was the first of the original big-3 digital BBS birds and although not the first to carry digital electronics 'the three' went on to become firm favourites with a host of digital enthusiasts world wide. UO-22 turned out to be the most reliable by far of the "three", KO-23 and KO-25 both having expired some time ago. For many years UO-22 has carried the bulk of satgate traffic around the globe for distribution into the packet radio system. For a time virtually all long distance personal packet radio mail messages were relayed through UO-22. It was launched on July 17th 1991 so when it finally comes time to pension off this wonderful satellite it will have made an indelible name for itself in amateur radio digital satellite circles.

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Beyond our shores

David A. Pilley VK2AYD
Davpil@midcoast.com.au

Canada

Canadian licensing changes proposed

Radio Amateurs of Canada (RAC) has proposed formally that Industry Canada (IC) eliminate Morse code as a ham radio testing requirement for operation in bands below 30 MHz in Canada. RAC wants Industry Canada to continue to make Morse testing available to Canadian amateurs still wishing to have that qualification specified on their certificate, however. At the same time, the RAC wants IC to require applicants for the Basic examination to score at least 80 percent before permitting operation below 30 MHz.

Under the proposal, present Basic plus Morse holders would be considered as holders of the new Intermediate qualification. Basic holders who have not passed the Morse exam would continue to hold that class with existing operating privileges. Current Basic-without-Morse licensees who retake the Basic examination and obtain at least 80 percent would be upgraded to Intermediate.

RAC also recommends that the passing grade for the Basic and Advanced examinations be raised from 60 to 70 percent when the Morse requirement is dropped. Ultimately, RAC wants the passing grade to be upped to 75 percent for all examination elements.

Anyone holding both the Basic and Advanced qualifications would have HF privileges, and the Intermediate qualification or Basic plus Morse would become a prerequisite to obtaining the Advanced.

The RAC also wants IC to create a new entry-level qualification. RAC President Daniel Lamoureux, VE2KA, says Canadian amateurs can anticipate implementation of a first phase of the RAC recommendations by year's end.

(ARRL N/L 13/8)

United Nations

Radio in service: FITTEST seeking assistance

Those involved with Rescue Radio may find some appeal in this. The United Nations World Food Program's FITTEST operation is currently seeking Telecommunications Specialists for 3 to 6 month contracts.

FITTEST stands for the Fast Internet and Telecoms Emergency Support Team and it offers constant travel, constant pressure, constant challenges in a job that still allows you to combine a family life and a professional life in a two or three months on one month off duty regime.

Typically, FITTEST hires people with non-conventional career paths to provide emergency deployment of VHF and HF networks, Satellite and Telephone systems. They are looking only at people with direct hands-on experience willing to work under harsh circumstances.

To get an idea of the work they do in Iraq and Afghanistan have a look at their web sites. They are in cyberspace at http://www.hiciraq.org/mediacentre/gallery/FITTEST/ http://www.qsl.net/ya5t. Applications to mark.tell@wfp.org and martin.kristensson@wfp.org

Belgium

Galileo GPS system approved by EU

Officials in Brussels, Belgium say the satellite navigation system the European Union is planning will not clash with one already in operation by the United States. This, as an agreement signed in that European nation will make sure that the proposed Galileo system will be compatible with the U-S owned Global Positioning System.

Galileo is slated to begin operation 2008. Together the two systems are expected to become a single world standard for positioning and radio navigation.

(ANS)

UK

Internet linking in the UK

Telecommunications regulators are about to make ham radio Internet linking a lot easier on the other side of the Atlantic. This, as Ofcom which is the UK equivalent of our ACA issues new and more liberalized rules.

Ofcom has announced the decisions it has taken about changes to the procedure and terms of issuing Notices of Variation (NoV) for Internet Linking Gateways.

Ofcom proposes to pass the Internet-linking NoV process to the RSGB to issue NoVs on behalf of Ofcom. The RSGB will be announcing procedures for NoV renewal shortly and queries on the renewal process should be directed to the Society.

Ofcom's decisions were made following the notification of four proposals, which gave those holding an NoV the opportunity to make representations.

(RSGB)

Brazil

WRTC-06 is underway.

The next World Radio Team Championship is being planned to be held in Florianopolis, Brazil in July 2006. The first Committee, comprising 11 Radio Amateurs from Brazil has now been formed and a special Web page (http://www.wrtc2006.com) has been set up for interested Amateurs where you will find current information and the criteria to participate. There is also a reflector (http://maresia.onda.com.br/mailman/listinfo/wrtc2006) where you can subscribe and be kept up to date on events as they proceed toward 2006.

As Radio Amateurs, the WRTC is the nearest contest that we have to the Olympics. It is held on HF in both CW and SSB modes and is held during the IARU contest in July of each year. WRTC is held every 4 years and was first created in 1994 and, like the Olympics, a different country hosts each event. An invitation is given to each country to send a two-person team to compete in the event and in the past Australia has been present at two events. It would be great to see Australia taking part in the 2006 "games". Any takers? Be assured at this event you will be competing with the 'best of the best' world wide and the social happenings will be a memory for ever!

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Ian Godsil VK3JS

Contest Calendar October – December 2004

2/3	Oct	Oceania DX Contest	(SSB)
2	Oct	PSK31 Rumble	
3	Oct	RSGB 21/28 MHz Contest	(SSB)
9/10	Oct	Oceania DX Contest	(CW)
16/17	Oct	JARTS WW RTTY Contest	
16/17	Oct	Worked All Germany Contest	(CW/SSB)
17	Oct	Asia-Pacific Sprint Contest	(CW)
17	Oct	RSGB 21/28 MHz Contest	(CW)
30/31	Oct	CQ WW DX Contest	(SSB)
6/7	Nov	VK VHF+ Field Day	(CW/SSB/FM)
7	Nov	High Speed Club CW Contest	
13/14	Nov	Worked All Europe RTTY Contest	
13/14	Nov	Japan Intl. DX Contest	(SSB)
13/14	Nov	OK/OM DX Contest	(CW)
19	Nov	YO DX PSK31 Contest	
20/21	Nov	RSGB 160 Metres Contest	(CW)
20/21	Nov	RNARS CW Activity Contest	
17/18	Nov	CQ WW DX Contest	(CW)
3/5	Dec	ARRL 160 Metres Contest	(CW)
4	Dec	TARA RTTY Melee	
11/12	Dec	ARRL 10 Metres Contest	(CW/SSB)
18	Dec	OK RTTY Contest	
18/18	Dec	Croatian DX CW Contest	
26 until mid-Jan., 2005	Dec	Ross Hull Memorial	VHF+ Contest

Some few months ago I asked if anyone was using Linux for AR work. Now I would like to say thanks to Robert VK3ESE who, just as I was compiling these notes, emailed me to say that he uses this OS and to give some very useful information to follow up. Thanks Robert, much appreciated.

I have also heard that Eddie VK4EDI is interested in exploring this OS and that he has friends either also interested or already using it. I don't imagine for one minute that Linux or Mac OS will replace Windows, but you may be surprised how widespread Linux is already among American contesters.

Please note our big DX event coming up in October! See you there.

73, Ian Godsil VK3JS

QRP Day Contest 2004 RESULTS

From Ron Everingham VK4EV

Logs submitted

HF

VK2LCD/QRP *~	SSB	62 points
VK5BLS/QRP *~	CW	55 points
VK3LK/QRP*~	CW	55 points
VK7RO/QRP ~	CW	54 points
VK2AVQ/QRP *~	CW	53 points
VK2CW/QRP ~	CW	41 points
VK4CEU/QRP ~	CW	31 points
VK4EDI/QRP ~	CW	24 points
VK3GDM/QRP	CW	5 points
VK3NEA/QRP	CW	4 points
VK3JS/QRP	Special Event Station Check Log.	

VHF

VK3JS/QRP	FM	30 points

*Denotes Home Brew Equipment used.
~Denotes contacted special station VK3JS/QRP

Certificates :-

Best 4 hours operation HF

First place	SSB Mode	Chris	VK2LCD/QRP	62 points
First place	CW Mode	Adrian	VK3LK/QRP	55 points
First place	CW Mode	Barry	VK5BLS/QRP	55 points
Second place	CW Mode	Rich-ard	VK7RO/QRP	54 points

Best 4 hours operation VHF

First place	FM Mode	Ian	VK3JS/QRP	30 points

Congratulations to all certificate winners and thanks to all for submitting your logs.
Hope you all enjoyed participating in the contest.
73 de Ron VK4EV.

Highest scorer in each hour in each mode in each area:

Hour 1.	SSB	Chris	VK2LCD/QRP	23 points
	CW	Adrian	VK3LK/QRP	22 points
	CW	Greg	VK2CW/QRP	37 points
	FM	Ian	VK3JS/QRP	6 points
Hour 2.	CW	Richard	VK7RO/QRP	30 points
	CW	Bob	VK2AVQ/QRP	24 points
	CW	Eddie	VK4EDI/QRP	24 points
Hour 3.	CW	Barry	VK5BLS/QRP	23 points
	CW	Dave	VK4CEU/QRP	24 points
Hour 6.	CW	David	VK3GDM/QRP	5 points

Rules – Spring VHF-UHF Field Day 2004

from John Martin (VK3KWA), Contest Manager

The Spring VHF-UHF Field Day will take place on the weekend of November 6 and 7, 2004. Logs will be due by November 22, and entrants are also invited to include any comments or suggestions about the rules.

Dates

Saturday and Sunday November 6 and 7, 2004.

Duration in all call areas other than VK6:

0100 UTC Saturday to 0100 UTC Sunday.

Duration in VK6 only:

0400 UTC Saturday to 0400 UTC Sunday.

Sections

A: Portable station, single operator, 24 hours.
B: Portable station, single operator, 6 hours.
C: Portable station, multiple operator, 24 hours.
D: Portable station, multiple operator, 6 hours.
E: Home station, 24 hours.

Single operator stations may enter both Section A and Section B. If the winner of Section A has also entered Section B, his log will be excluded from Section B. The same applies to the winner of Section C if the station has also entered Section D.

General Rules

A station is portable only if all of its equipment is transported to a place that is not the normal location of any amateur station. Operation may be from any location, or from more than one location. You may work stations within your own locator square. Repeater, satellite and crossband contacts are not permitted.

One callsign per station. If two operators set up a joint station with shared equipment, they may choose to enter Section A or B as separate stations under their own callsigns, or Section C or D under a single callsign. If they enter Section A or B, they may not claim contacts with each other. Stations with more than two operators must enter Section C or D. Operators of stations in Section C or D may not make any contest exchanges using callsigns other than the club or group callsign.

No contest operation is allowed below 50.150 MHz. Recognised DX calling frequencies must not be used for contest exchanges. Suggested procedure is to call on 0.150 on each band, and QSY up if necessary.

Contest Exchange

RS (or RST) reports, a serial number, and your four digit Maidenhead locator.

Repeat Contacts

Stations may be worked again on each band after three hours. If the station is moved to a new location in a different locator square, repeat contacts may be made immediately. If the station moves back into the previous locator square, the three hour limit still applies to stations worked from that square.

Scoring

For each band, score 10 points for each locator square in which your station operates, plus 10 points for each locator square worked, plus 1 point per contact. Multiply the total by the band multiplier as follows:

6 m	2 m	70 cm	23 cm	Higher
x 1	x 3	x 5	x 8	x 10

Then total the scores for all bands.

Logs

Logs should cover the entire operating period and include the following for each contact: UTC time, frequency, station worked, serial numbers and locator numbers exchanged, points claimed.

Cover Sheet

The cover sheet should contain the names and callsigns of all operators; postal address; station location and Maidenhead locator; the section(s) entered; the scoring table; and a signed declaration that the contest manager's decision will be accepted as final.

Please use the following format for your scoring table. In this example the operator has operated from one locator and worked four locators on each band:

Band	Locators activated (10 points each)	+	Locators worked (10 points each)	+	QSOs (1 point each)	x	Multi-plier	=	Band Total
6 m	10	+	40	+	40	x	1	=	90
2 m	10	+	40	+	30	x	3	=	240
70 cm	10	+	40	+	20	x	5	=	350

Overall Total = 680

A sample cover sheet and scoring table has been included in the postings on WIA web site. Copies can also be obtained from the e-mail address given below.

Entries

Paper logs may be posted to the Manager, VHF-UHF Field Day, 3 Vernal Avenue, Mitcham, Vic 3132. Electronic logs can be e-mailed to jmartin@xcel.net.au. The log formats below are acceptable: ASCII text, MS Office RTF, DOC, XLS or MDB. If you use Office 2000 or later, please save the files in Office 97 format.

Logs must be received by November 22, 2004. Early logs would be appreciated.

Scoring table

Band	Locators acti-vated 10 points each		Locators worked 10 points each		QSOs made 1 point each	=	Total		Band Multi-plier	Band Total
50 MHz		+		+		=		x	1	=
144 MHz		+		+		=		x	3	=
432 MHz		+		+		=		x	5	=
1296 MHz		+		+		=		x	8	=
2.4 GHz		+		+		=		x	10	=
3.4 GHz		+		+		=		x	10	=
5.7 GHz		+		+		=		x	10	=
10 GHz		+		+		=		x	10	=
Higher		+		+		=		x	10	=

FINAL TOTAL =

WIA VHF-UHF FIELD DAY

Section entered (tick one):

- ☐ **A Single operator 24 hours**
- ☐ **B Single operator 6 hours**
- ☐ **C Multi operator 24 hours**
- ☐ **D Multi operator 6 hours**
- ☐ **E Home station 24 hours**

If entering more than one section, please use a separate copy of this sheet for each section.

For Section B or D, time period to be scored:
The station operated from the following grid locators:

The station was operated in accordance with the rules and spirit of the contest.

I / We agree to accept the.
Contest Managers's decision as final

Signed:

Contest Date :

Station callsign:

Names (inc. surnames) and callsigns of operators:

Postal address:

RESULTS AND CERTIFICATE (tick one):
☐ **PAPER COPIES in the mail to the above address**
or
☐ **PRINT YOUR OWN (Requires Adobe Acrobat Reader and colour printer for the certificate)**

Send PDF files to the following e-mail address:

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VHF/UHF – an expanding world

David Smith VK3HZ – vk3hz@wia.org.au
Leigh Rainbird VK2KRR – vk2krr@telstra.com

Weak signal

David Smith - VK3HZ

Spring is here and the weather seems to have turned for the better. This means that the Spring VHF/UHF Field Day is not far off. This year, it will be held over the weekend of the 13-14 November. If you are planning to go out, please tell us about it by posting a message on the VK-VHF reflector. If you are not already registered for this reflector, details may be found at http://pobox.une.edu.au/mailman/listinfo/vk-vhf. We are looking forward to a large turnout this year.

Unfortunately, it looks like another of our bands may be under threat. The ACA has released a discussion paper on proposed apparatus licensing arrangements in the 5725 - 5825 MHz band for broadband wireless access in regional and rural areas of Australia. Changes could effect operation at 5760 MHz with further high power exclusion zones being implemented as on the 9cm band. The paper may be found at:

www.aca.gov.au/radcomm/frequency_planning/radiofrequency_planning_topics/hp5g8disc.htm.

Unfortunately, the closing date for comments has already passed. However, it is hoped that the WIA (newly invigorated) will be heavily involved in discussions about the future of this band.

Our Digital Modes correspondent – Rex VK7MO – is planning a digital DXpedition to the heart of Australia. He plans to be in Adelaide on 2 October to give a talk on Digital Modes. He will then be heading north to activate some gridsquares on 2 m via Meteor Scatter using FSK441. He is also going to attempt to work all states on 2 m MS in one day. More information will be posted to the VK-VHF reflector when Rex has finalised his plans.

Now to news of activity in the upper reaches of our spectrum. On 27 August, KF6KVG and W0EOM extended their record on the 122 GHz band to 24.88 km, across the Silicon Valley. Precision 1 ft dishes were used. Transmit power was about -23 dBm (5 microwatts) and noise figure estimated at 25 dB. Triplers with output in the 40 to 41 GHz range with power of +19 dBm were used to drive the mixers and multipliers. Transmit frequency was 122.4 GHz, referenced to 10 MHz. Signals were at the noise floor but easy CW copy. Weather was calm, mild and fairly dry. The 2nd harmonic on 81.6 GHz was used to align the antennas.

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

Digital Modes

Rex Moncur – VK7MO

It is good to see some of the more remote areas trying out FSK441 on 2 metre. Don, VK6HK, has worked Ron, VK4KDD/6, portable at Port Hedland and both stations were monitored in Broome by Cec VK6AO/6. Rex, VK8RH, in Darwin and Ron, VK4KDD/6 completed the first FSK441 Meteor Scatter contact from VK6 to VK8. Jeff, VK8GF, in Alice Springs is also setting up for FSK441. What this means is that no station on the Australian mainland is too remote to have regular contacts on 2 metre to someone else. Note that FSK441 works well in the range 1000 to 1800 km and that contacts have been made as short as 500 km and as long as 2300 km. Welcome to Errol, VK4ZHL, and John, VK2GCN, who have joined the meteor scatter activity sessions.

Joe Taylor, K1JT, gave an outline of the next mode for WSJT called JT1 at the recent EME 2003 conference in Princeton in the USA. This mode moves away from FSK to PSK and uses even more intensive source encoding and Forward Error Correction to achieve a 4 dB advantage over JT65 in simulation tests. A useful advantage of the new mode is that the total bandwidth is only 2.5 Hz and a number of stations can call in the same SSB passband without interfering with each other. A listening station could then decode the particular station they wished to work by clicking on the signal on the spectrum display or even click and decode a number of signals to select which one they wish to work. Joe advises that he hopes to release the new mode some time in the Fall or our Spring.

There is some evidence that JT65 can give false decodes when trying to receive a tropo-scatter signal in the presence of an AE (aircraft enhanced) signal. This is probably to be expected as tests between David, VK3AUU and Rex, VK7MO, show Doppler shifts of 3 or 4 Hz on AE signals and JT65A tones are only spaced 2.7 Hz apart. The problem usually shows up as exotic callsigns like UZ3ROD or LY2MY and a grid square in some outlandish place. The problem may also show up due to meteor pings where Doppler shifts on 2 metre are typically up to a few tens of Hz. It is particularly prevalent on the path between VK3II and VK7MO where the presence of aircraft can be recognised by a ripple on the green signal strength line. The only solution we have come up with so far is to recognise and ignore false decodes. We did think that the wider tone spacing of JT65B or C might help but tests proved these also suffered the same problem.

It is sometimes useful to have a better idea of the DF (Frequency Difference from the sync frequency of 1270.5 Hz) reported by JT65 in looking for a very weak station on Spectran or a small spike on the spectrum display. On terrestrial paths, the DF should be symmetrical such that if another station sees you at say +100 Hz, you should see them at -100 Hz. There can be small differences in symmetry due to some computers (usually laptops) not generating the tones on the exact frequencies but these are less than 15 Hz. On EME paths the DF is affected by the Doppler shift due to Earth rotation on both paths and this adds twice the

Doppler shown on JT65 to the DF. The formula is DF = 2 X Doppler - other station's reported DF. Also in looking for a very weak signal on Spectran it is useful to mark any frequency you think is showing some weak specks and check this against any later specks. It turns out that if you enable the audio filter on Spectran (Filter > Show), you can set a pair of green marks for the audio bandwidth on the scale by right and left clicking just above the scale and if you set these at the same point it provides the marker for identifying a weak signal.

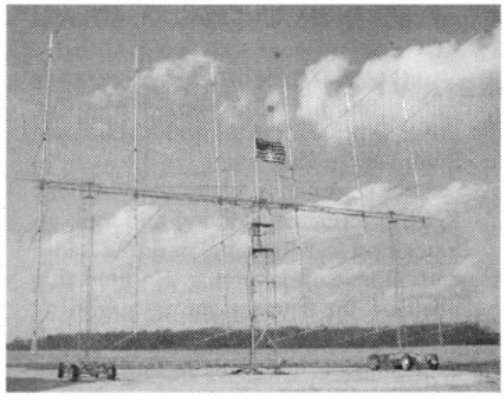
Please send any Digital Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

EME

David Smith – VK3HZ

The 11th International EME Conference took place in early August in New Jersey with participants from 14 countries. A summary of conference activities can be found at http://www.nitehawk.com/rasmit/NLD/eme0409.pdf. Keynote speaker was Joe Taylor, K1JT, who presented "Fundamental Limits on Weak Signal Communication", including a discussion on the proposed new WSJT mode – JT1. His presentation can be found at http://pulsar.princeton.edu/~joe/K1JT/EME2004.PDF.

Joe is attempting to squeeze every ounce out of this new mode to maximise performance. This means that the messages passed across contain the absolute minimum required. However, his example QSO (using Rex VK7MO's callsign) created a flurry of lively discussion on the Moon-Net reflector about what actually constitutes a valid QSO. In JT1, both callsigns and signal strengths are exchanged and acknowledged, but the initial response to the CQ optionally uses an abbreviated callsign to identify who is being responded to. In the end, commonsense prevailed and there was agreement that Joe's message sequence was valid. However, I found it rather ironic considering that the currently accepted message sequence for an EME CW QSO falls well short of acceptable, I believe, for a valid QSO.



Gary KB8RQ's EME array

Only callsigns are exchanged – no "unknown" information such as signal strength – with M, O, RO and R also sent to indicate progress of the QSO. Many stations do exchange RST signal reports, but this is not required for a "valid" QSO. And, unfortunately, apparently many "invalid" QSOs, particularly pre-arranged skeds, do slip through the gaps.

In mid August, good EME conditions matched up with reasonable times (at both ends) for the NA and EU windows, providing an opportunity for smaller stations to work some of the big guns via EME on digital modes. Dave W5UN is one big gun who has taken enthusiastically to digital modes and provides a huge signal, helped, in true Texan style, by his array of 32 x 5 WL 17 element yagis and 1.5 kW. He worked a number of smaller VK stations including Ian VK3AXH, Graham VK3XDK and me. I also managed to work Gary KB8RQ whose array is "only" 24 x 13 elements, supported by two truck chassis.

This all shows that EME contacts are possible for smaller stations when running digital modes. Hopefully many of them will get the EME bug and go on to build larger antenna arrays, with the ultimate goal of hearing their own echo off the moon.

2 m & 70 cm FM DX

Leigh Rainbird - VK2KRR

Very poor 2 & 70 FM DX conditions again in Australia for August. More cold, wet and windy conditions moving through in the south, making for a very unstable troposphere. On the north Queensland coast, more enhancement of signals was noted, but not much in the way of extended paths unfortunately.

Mike VK4MIK at Butchers Creek on the Atherton Tablelands, reports on a number of occasions during August, when he was able to access the Townsville 146.700 repeater at around 250 km south. On most occasions Mike has been running low power tests and has been able to run down to 5 watt, and some times as low as 1 watt has been no trouble.

The frustrating part for Mike and the other operators up that way is that the conditions have not produced long paths down the coast like it should. But, on the 18th of August, a slight bit of relief was provided. At 8.47 pm, VK4MIK made it into the Townsville repeater and spoke to Felix VK4FUQ. After this, Mike made the 535 km trip to VK4RMK in Mackay and had a QSO with Wal VK4AIV. A short simplex contact was also attempted and completed between VK4AIV and VK4MIK on 146.500 at 544 km. This is Mike's longest 2 m simplex contact, well done guys.

Moving to the southeast, there were no major openings in August. The only real signal enhancement noted was "frontal enhancement" in the evening of Wednesday the 25th of August. The day had been unusually warm, over 20 deg C and warm air was being pulled in from the north ahead of a strong weather front.

Earlier Wednesday morning, knowing that there was the chance of frontal enhancement, I checked the BoM rain radar for the Adelaide area, this indicated the presence of signal enhancement in that area. Later, I caught up with Brian VK5UBC from Gawler, who did confirm that there were some semi local conditions to the west in the morning.

continued next page

Silent keys

Clem Tilbrook VK5GL

Clem was born on 26th March 1912 in Hove, South Australia and spent his childhood and teenage years there. He developed a fascination with radio and electronics in his early teens and this stayed with him throughout his life.

He was apprenticed to Gerard and Goodman's, Adelaide in the 1930s and was Manager of their Radio Department when he retired in 1969.

He married "Dot" Chandler in 1935 and they had three sons Graham, John and Peter.

Clem served in the RAAF Specialist Services Radar Wing, and served at Richmond Air Base, Fig Tree Maintenance Depot, NSW, Garbutt Aerodrome, Queensland and finally at RAAF HQ, St Kilda, Victoria in the development area as Flight Lieutenant.

Clem considered himself an "Aussie Battler" from "humble roots and poor family background" None of this held him back from what he wanted to achieve. When he retired from Gerard and Goodman's he set up his own business as the only producer of quartz crystals in SA and ran the business for thirty years. Clem made many improvements in the art of crystal grinding and was respected worldwide for his skills in this area.

Dot died in 1980 and Clem lived alone working at his electronic, TV and Ham Radio interests.

He was always cheerful and friendly.

He was "A very generous, loving father who possessed a brilliant technological mind Resting peacefully in the arms of God" to quote his funeral service conducted by his niece Captain Judith Brown of the Salvation Army.

Jim McLachlan VK5NB

Cornelius (Keith) Heemskerk VK2JY

It is with much sadness we record the passing of another ham. Keith Heemskerk sadly passed away on the 1st of May 2004 in Springwood Hospital, after a long illness.

Keith was first licensed in 1968 in Portland Victoria.

A native of Holland, he became interested in the wonderful world of Radio at an early age having built his first crystal set when he was 11 years old. Keith cherished the ambition to operate his own short wave radio station but unfortunately World War II intervened and all plans were put on hold.

When the war was over he undertook a course to become a ships radio operator, but after completing the first part of the course, he was drafted into military service. Keith carried out his military duties as a national serviceman with the Royal Dutch Electrical and Mechanical Engineers in East Java.

After completing his military service Keith returned to Holland and took up a position as a Technician doing Radio and Television servicing. He held this position for 3 years before migrating to Australia in the early 50s, to work as a panel beater for the Ford Motor Company!

He did however, return to his trade of Radio and Television in 1956 when Television was introduced to Australia, after doing a refresher course. He was a successful businessman doing Radio and Television repairs in Portland Victoria.

Keith passed the required examinations to obtain his Amateur Operators Certificate of Proficiency in 1967, and in1968 he was issued the call sign of VK3AIH.

Keith and his XYL Pam, moved to the Blue Mountains about 8 years ago and Keith was allocated the call of VK2JY. A keen home-brewer, Keith experimented in all aspects of the hobby, with much of his equipment being brewed in the small, but modest shack in his back yard. SSTV, RTTY and Satellite operation are also amongst the activities Keith experimented with.

Keith was a member of the Blue Mountains Amateur Radio Club from when he first moved to the Blue Mountains. To all that knew him, Keith was a thorough gentleman, and will be sadly missed.

To the families of Pam and Keith, our thoughts are with you.

Daniel Clift VK2DC
Sec. BMARC.

VHF/UHF – and expanding world *continued*

Port Lincoln 2 m & 70 cm both S9+20 and Cowell at S9. Brian worked 5ZAW (Adelaide) & 5AEP at Port Lincoln via Lincoln 2 & 70. Also worked 5HBG at Whyalla via Cowell and could hear him simplex.

In the evening there was major thunderstorm activity around the Adelaide area and to the south below Kangaroo Island. There were very strong winds noted at the Adelaide beacon site, with a maximum wind gust of 113 km/h recorded, hence, there were no signals noted from the Adelaide area, the front was too far advanced.

After 8.30 pm that night, conditions virtually in a straight line from my QTH to Ararat were very good. This did not extend to Mt Gambier or Melbourne.

I initially noted Shepparton and Bendigo repeaters at full scale. Looking further out, Ararat was almost full scale. Switched to 70 cm and in the same direction, had a go at the Grampians 70 cm repeater at 471 km, it was also full scale.

Among a number of stations that called in, one was Tim VK3JTM, who was portable on One Tree Hill around Ararat. Tim was using a mobile whip on 2 and 70. We tried simplex and Tim was 5/5 on 2 m and 5/7 on 70 cm. Peter VK3XDP, just east of Bendigo also found us on simplex and he was 5/5 on 2 and 5/9 on 70.

These contacts almost indicate a slight non-ducting tropo (NDT) effect, which I have mentioned in a previous article. While some of the usual NDT indicators were present (out going high pressure, some stronger 70 cm over 2 m), others were not (incidence of severe QSB, most cases showed equal if not better 2 m over 70 cm).

Please remember to send through any 2 & 70 FM DX reports to Leigh VK2KRR at vk2krr@telstra.com.

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Robin L. Harwood VK7RH

Swansong for "Voice Of Switzerland"

Swiss Radio International is to cease all radio broadcasts at the end of this month, October, and will thereafter concentrate exclusively on its Internet platform, www.swissinfo.org. SRI ended its news and current affairs programming in April and they have been broadcasting retrospectives of Swiss Radio International. I do clearly remember hearing Switzerland when I commenced shortwave listening in the mid fifties. I cannot recollect the actual frequency yet I am certain it was in the 31 metre band. Many of the oldies will recall its distinctive interval signal of a music box and broadcasts started with the sound of Swiss chronometer. The Swiss folk music towards the end of the transmission was always a highlight

I also believe that there will be a marked reduction in shortwave high frequency usage after the commencement of the B-04 period, on October 26th. The 11 metre allocation will be devoid of any broadcast activity because Radio France International and Deutsche Welle have not registered frequencies. These two organisations were the only occupants of 11 metre for many years and I do not expect that any activity will appear until the Sunspot numbers pick up again later in the Solar cycle. Hams will already know that propagation on 28 MHz has sharply decreased.

Spring has well and truly arrived here and although propagation on the higher frequencies has picked up, the MUF has not gone as high as it did 12 months ago. I notice that other HF users have cut back their operational activities, revealing signals that were often hidden. Not surprisingly digital modes also have proliferated yet analogue modes are still used especially in less developed regional areas. Another fact is the continuation of apparent illegal unregistered SSB signals within reserved allocations has been very difficult to control, particularly in Asia and Africa. Many of these illegal signals are from international waters or located within remote sparsely populated regions.

The reduced output of the major broadcasters has allowed rarely observed domestic stations to be heard. These are from Latin America, Africa and western Asia. HF is being phased out in favour of FM relays and television has also had an impact on listening patterns. Latin America used to have hundreds of shortwave signals, often from small senders in remote regions but often when they broke, it was not economical to repair them.

I did come across yet another DX program over World Harvest Radio via its transmitters in Furman, South Carolina (WSHB). It is on Mondays at 2130 to 2155 and is called "Radio Weather" It is clearly modelled on "DX Partyline" and is produced in Ontario, Canada by Rod Hembree. I believe that this program may also be on WBCQ in Monticello, Maine.

The latter station is often heard here on 9330 reduced carrier lower sideband. It is somewhat unusual as most senders employing reduced carrier transmissions utilise the upper sideband. WBCQ is heard at 2130 but this may alter after October 26th.

Radio Australia seems to be transmitting on 15240.5, an unusual offset and I think the transmission is not coming from the Shepparton site, possibly from Taiwan. The time was 2200 and I initially thought the signal was coming from Radio New Zealand International yet although it was from Wellington, it was indeed via the Radio Australia facilities to the Pacific. RNZI had a separate programme stream via its own sender on 17675 at that time.

More on Spam: In last month's column, I remarked on the increasing amount of Spam that has flooded my primary ISP mailbox. I should have remarked that my WIA address is free of Spam. I still had to change my address, as 66% of my email was Spam, too much for Internet filters to handle. I reluctantly have changed my primary e-mail address, which has visibly reduced the amount of Spam. What I have learned from this is to be very careful handing out your email address and if you have to post in public forum, use a specific address for that purpose. Don't be surprised that this email address will quickly gather Spam. I categorise these addresses as Spam traps. Well that is all for now. Yes you can certainly email me via vk7rh@wia.org.au although Spam will be automatically filtered out.

Good monitoring and 73- Robin L. Harwood VK7RH

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Technical abstracts

Peter Gibson VK3AZL

Attenuators

The regular column, 'Hands-on Radio' in QST for February 2004 by Ward Silver, N0AX features a short discussion on attenuators.

Background

Attenuators are used in many different audio and RF applications. Your HF rig probably has an attenuator at the front end and your signal generator uses one to switch output voltage ranges. In addition to voltage reduction, attenuators can be used for impedance matching and isolation. Whilst most attenuators are made from fixed or variable resistors, some adjustable RF attenuators are made from PIN diodes.

There are many types of attenuator circuits and Figure 2 shows the most common, the T, Pi, H, O and L. The T, Pi and L are all unbalanced, meaning that all circuit voltages are referenced to the common ground. The H and O are balanced equivalents of the T and Pi respectively. The balanced circuits do not have a common ground. Attenuators are often referred to as 'pads' and attenuation as 'padding'.

Attenuators are designed to have specific input and output impedances, because the source and load impedances affect how much voltage appears across the attenuator resistors. The source and load often need to be connected to a specific impedance to operate properly.

Designing attenuators

The equations for attenuator resistor values are complex, so tables for values of attenuation and impedance are widely available. Table 1 shows one such table for symmetrical attenuators (same input and output impedance).

As most amateur equipment operates with 50 ohm input and output impedances, as an example, let's try designing a 10 db, 50 ohm attenuator.

Although either a Pi or T circuit can be used, the Pi has a physical advantage of not requiring a centre connection. From Table 1, the Pi configuration gives values

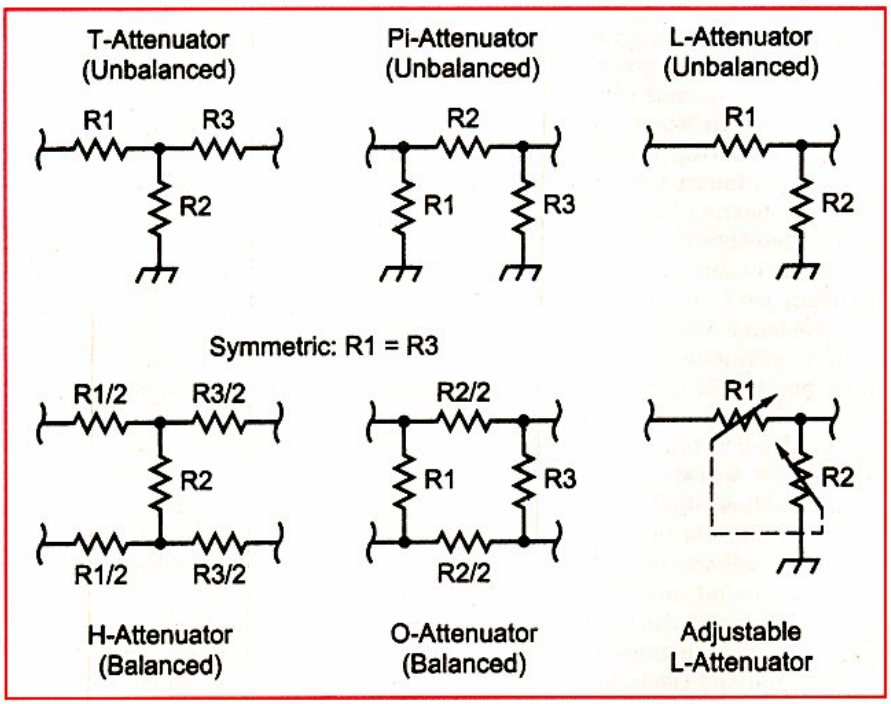

Figure 2 – Several common attenuator circuits. To make the attenuators symmetric, make values of R1 and R3 equal

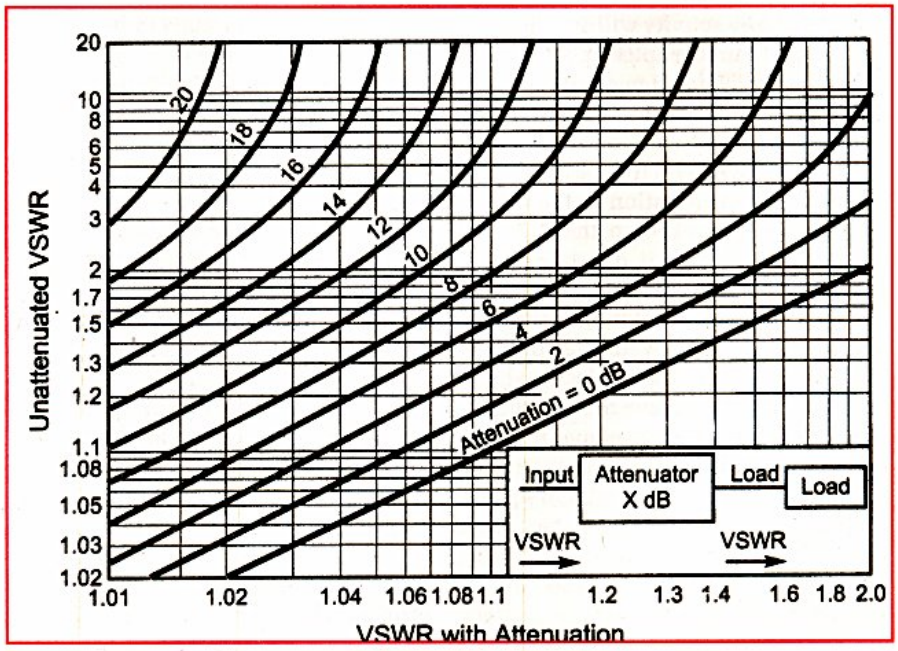

Figure 3 – Attenuation can prevent a high VSWR from upsetting a 50 ohm signal source. It can also mask a VSWR problem at your antenna

of 96.2 ohm for R1 and 71.2 ohm for R2 (R1=R3 for symmetrical attenuators). As these values are a little hard to obtain, preferred values of 100 and 75 ohm are used. As the ratio is still about correct, the attenuation should stay close to 10 dB but the impedance will be closer to 52 ohm.

If you want to have several of these attenuators for use around the shack, they should be installed in suitable enclosures. The enclosure should be a tight sealing metal unit with suitable connectors to make sure the signal goes through the attenuator and not around it.

Attenuators for isolation

Attenuators can also provide isolation between two systems. This is useful at RF, where output amplifiers are designed to work into a load of 50 ohm. An example is where a signal generator needs to see an impedance close to 50 ohm to maintain calibrated output level and purity. The input impedance of circuits such as filters, transmission lines or antennas is often anything but 50 ohms at some frequencies. An attenuator between the generator and the circuit under test helps provide isolation between the two. Figure 3 shows how an attenuator can provide isolation as well as presenting a reasonable VSWR to the signal source.

Attenuators for impedance matching

It is sometime necessary to operate two systems with differing input and output impedances. A common example would be trying to operate between 50 ohm and 75 ohm systems. The simplest, broadband solution to this problem is to match the systems with a fixed, minimum amount of loss. This can be done effectively with just a few resistors in an L configuration. These are called 'minimum loss' attenuators.

Figure 4 shows the L attenuator circuits used for this application and several sets of values that make useful impedance matching attenuators

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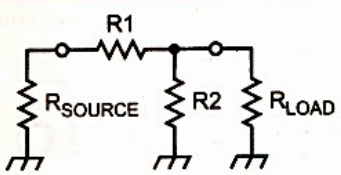
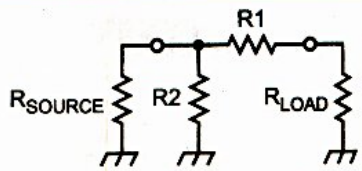
Table 1

Resistance Values for Symmetric T and PI Resistive Attenuators

Pi-Network Attenuators (50 Ω)			*T-Network Attenuators (50 Ω)*		
Atten (dB)	*R1, R3 (Ω)*	*R2 (Ω)*	*Atten (dB)*	*R1, R3 (Ω)*	*R2 (Ω)*
1	870.0	5.8	1	2.9	433.3
2	436.0	11.6	2	5.7	215.2
3	292.0	17.6	3	8.5	141.9
4	221.0	23.8	4	11.3	104.8
5	178.6	30.4	5	14.0	82.2
6	150.5	37.3	6	16.6	66.9
7	130.7	44.8	7	19.0	55.8
8	116.0	52.8	8	21.5	47.3
9	105.0	61.6	9	23.8	40.6
10	96.2	71.2	10	26.0	35.0
11	89.2	81.6	11	28.0	30.6
12	83.5	93.2	12	30.0	26.8
13	78.8	106.0	13	31.7	23.5
14	74.9	120.3	14	33.3	20.8
15	71.6	136.1	15	35.0	18.4
16	68.8	153.8	16	36.3	16.2
17	66.4	173.4	17	37.6	14.4
18	64.4	195.4	18	38.8	12.8
19	62.6	220.0	19	40.0	11.4
20	61.0	247.5	20	41.0	10.0
21	59.7	278.2	21	41.8	9.0
22	58.6	312.7	22	42.6	8.0
23	57.6	351.9	23	43.4	7.1
24	56.7	394.6	24	44.0	6.3
25	56.0	443.1	25	44.7	5.6
30	53.2	789.7	30	47.0	3.2
35	51.8	1405.4	35	48.2	1.8
40	51.0	2500.0	40	49.0	1.0
45	50.5	4446.0	45	49.4	0.56
50	50.3	7905.6	50	49.7	0.32
55	50.2	14,058.0	55	49.8	0.18
60	50.1	25,000.0	60	49.9	0.10



(A) Use for $R_{SOURCE} > R_{LOAD}$



(B) Use for $R_{SOURCE} < R_{LOAD}$

R_{SOURCE}	R_{LOAD}	R1	R2	Atten (dB)	Circuit
50	75	43	87	5.7	A
50	300	274	55	13.4	B
50	600	574	52	16.5	B
75	50	43	87	5.7	A
75	300	260	87	11.4	B
75	600	561	80	14.8	B
300	50	274	55	13.4	A
300	75	260	87	11.4	A
300	600	424	424	7.7	B
600	50	574	42	16.5	A
600	75	561	80	14.8	A
600	300	424	424	7.7	A

Figure 4 – Minimum-loss attenuators match system impedances while exacting the least amount of signal energy

Talking to the enemy

David A. Pilley VK2AYD
Davpil@midcoast.co.au

In the August 2004 edition of "Amateur Radio", I wrote about the "Secret Wireless War" and how Radio Amateurs played such an important part in WW II. The following is a true story of a remarkable QSO made by Jo Doering, DL1RK (now SK), in his own words.

"During WW II I served as a Lance Corporal in a special army signal corps unit in the Afrika Korps. We intercepted the enemy's tactical radio communications in the African war theatre and used to be Rommel's ears. Late afternoon on May 7th, 1943, five days before we had to surrender to Tunisia, our Company Commander asked me if I would like to communicate with the enemy. "Sure I do" was my answer. My first thought was that it was the surrender message, the end of the fighting in Africa. But the message to be sent was about a target not to be bombed. Since the Allied bombers flew in from the West, the message had to be addressed to the British 1st Army who operated in that area. Therefore, I chose a radio net from the HQ British First Army, noted frequency and call signs, took the message and went to the transmitter van about half a mile from our receiving units.

The British net was very busy that night and I had to wait for long time. Meanwhile, I practised with the straight key since I had not used one for about a year or so sitting in front of a receiver taking down foe's radio traffic. At last the net I was tuned into had worked all the traffic they had at hand. Now it was my turn. With the 80 watt Lorenz transmitter carefully set to zero beat and with the 'borrowed' call they had used last, I hit the key. 'QTC' and then I made a big mistake by using the British 8th Army 'X279' instead of the 1st Army 'QRK?'. The HQ station came back with a question mark. I started over again, but this time with 'QTC1 QRK? K'. QRK5 was the answer.

'DADIDADIDAH ~To the headquarters allied expeditionary forces in Africa from the HQ of the Axis force in Africa'. Then the guy that I 'borrowed' the call from came in: 'That's not me, it's a propaganda message from the enemy.' But I broke in with: 'Its not propaganda, but life or death for your own people.' In the end, the HQ station told me to go ahead with the message. It read, as I recall from my memory: 'Two ships are in the harbour of Tunis. One freighter with 600 allied prisoners in its holds and a hospital ship. Do not bomb those two ships to save the lives of your own people.'

I received 'QSL' for message and said I would 'QRX' tomorrow, same time, same frequency, for a possible reply. No reply was received during the next days. The event faded in my memory during the years to follow until in 1950, I bought a book about the war in Africa. In it, I found the message I had sent and the reaction that took place. General Alexander, Commander of the British 1st Army, met captured German General von Arnim and thanked him for the message that saved 600 of his soldiers. He agreed to send 600 wounded Germans in a hospital ship to Italy.

In a small way, I helped to add some human touch to this cruel war. Therefore, I call this my only worthwhile QSO ever."

Jo passed away a few years back. He was a well known ardent CW operator that had taken part in quite a few Dxpeditions. He was a member of the world wide 'First Class (CW) Operators Club' and we'll tell you more on this dedicated CW club in a later issue.

(Reproduced from the FOC History book).

The Bass Amateur Radio IRLP Group Inc

438.150MHz ~ -5 offset

Specialising in IRLP mode

J.O.T.A.

(Jamboree On The Air)

Help us to show the next generation the magic of amateur radio

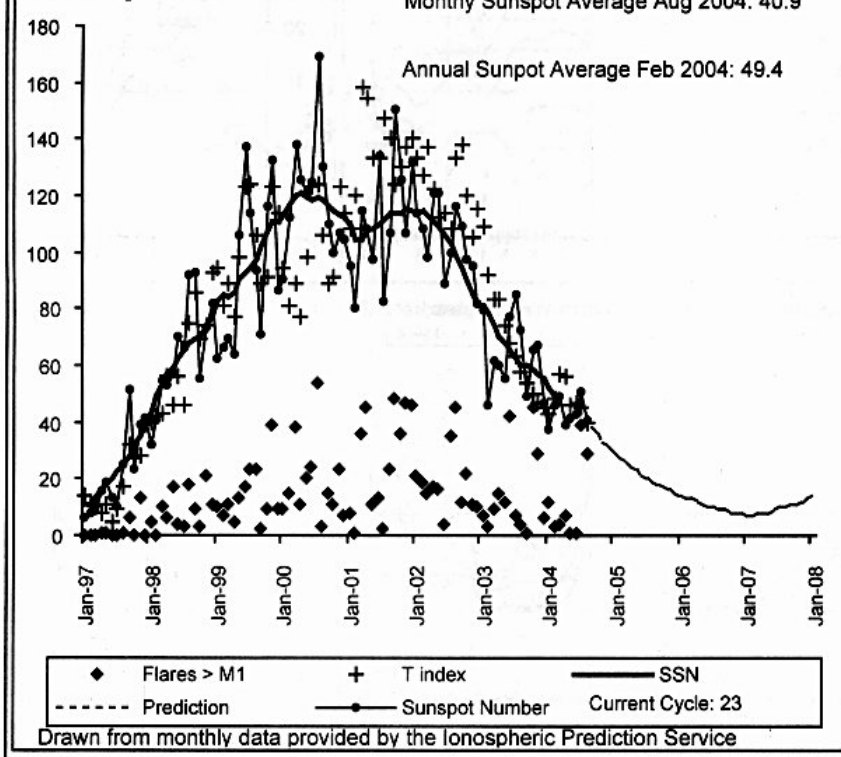
The Bass Amateur Radio IRLP Group Inc. this year are excited to be part of this year's J.O.T.A. (Jamboree On The Air)

This year J.O.T.A will be held on
the 16th and 17th October
at St Joseph Harris Park, Mt Martha.

So what can I do you might ask? You can dial up on reflector 9507 and be part of the world hook up or if you're in the area drop in for a cuppa and a chat and feel the buzz in the air as our youth make contact with other young members throughout the world. And as an added bonus you might have some fun too!

For further enquires contact the Secretary on 03 5982 1307

Sunspot Numbers



Drawn from monthly data provided by the Ionospheric Prediction Service

Over to you

Travellers' Net

I would like to draw your attention to the great service that VK6BO Roy and VK6HH Peter do for the travelling Ham. After several trips up north etc I know from personal experience that the service provided by the Travellers Net is to be commended.

I would like the WIA to somehow show recognition of this dedication, while these two gentlemen are still with us.

I am sure there must be some mode of recognition that the WIA can use to honour them for their dedication to this safety net service.

Jack Spark VK3AJK

HF Predictions

by Evan Jarman VK3ANI
34 Alandale Court Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.
These frequencies as identified in the legend are:-

- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

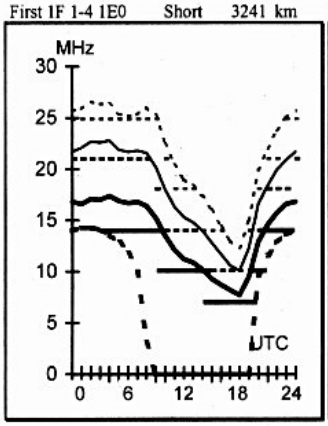
Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.
These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

October 2004
T index: 36

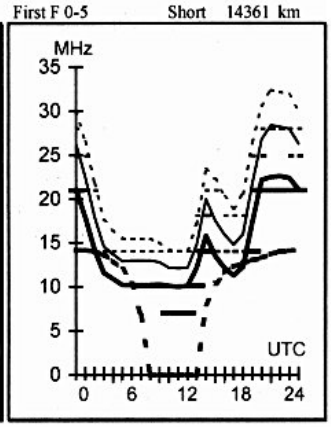
Legend

Frequency scale: UD, E-MUF, OWF, F-MUF, ALF, >10%, >50%, >90%
Time Scale

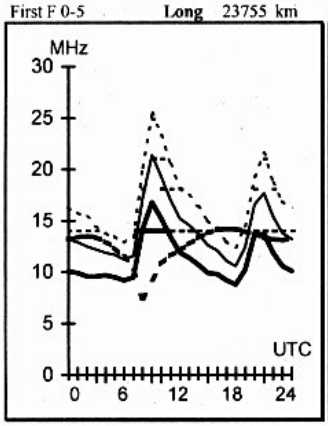
Adelaide-Auckland 104
First 1F 1-4 1E0 Short 3241 km



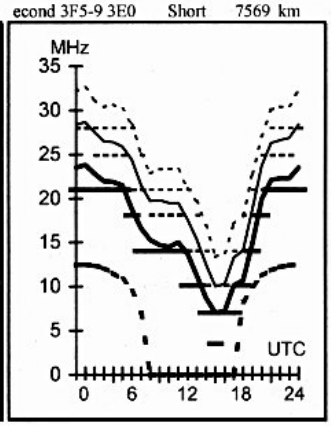
Brisbane-Chicago 57
First F 0-5 Short 14361 km



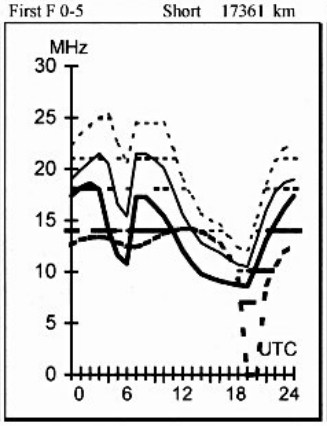
Adelaide-London 132
First F 0-5 Long 23755 km



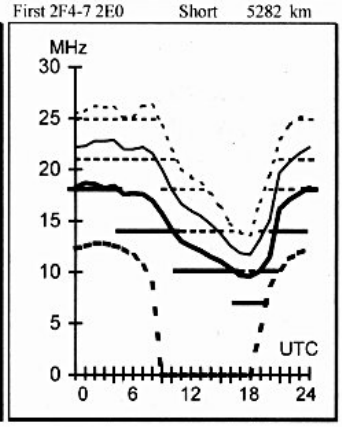
Brisbane-HonoLulu 49
econd 3F5-9 3E0 Short 7569 km



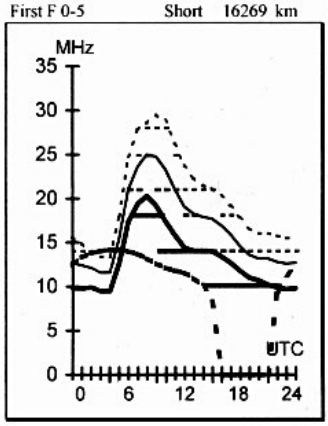
Canberra-Dakar 214
First F 0-5 Short 17361 km



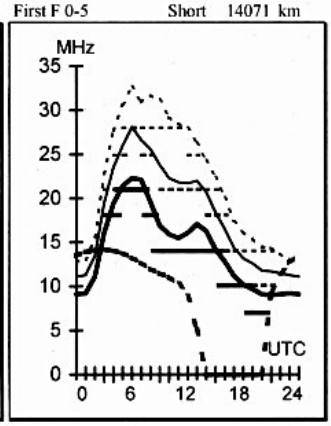
Darwin-Christchurch 139
First 2F4-7 2E0 Short 5282 km



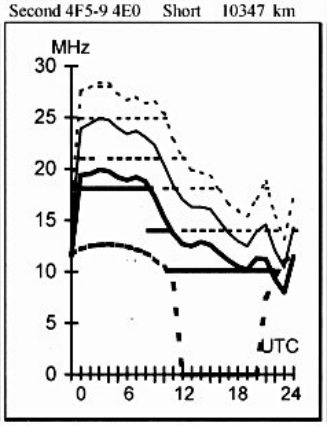
Adelaide-London 312
First F 0-5 Short 16269 km



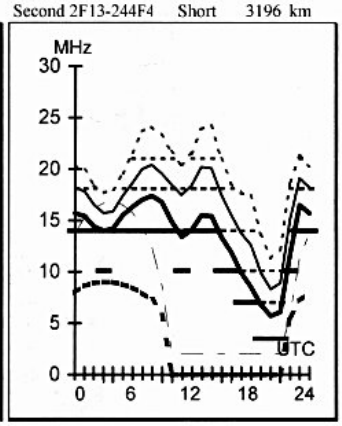
Brisbane-Moscow 321
First F 0-5 Short 14071 km



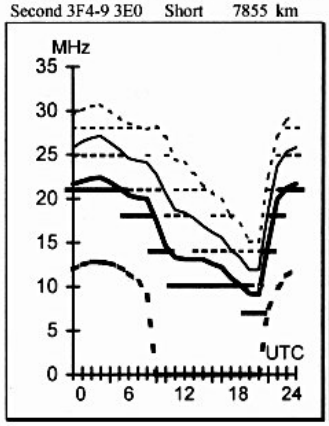
Canberra-New Delhi 303
Second 4F5-9 4E0 Short 10347 km



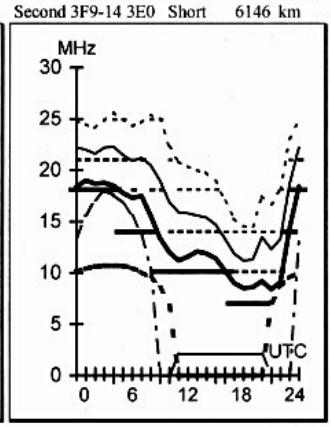
Darwin-Manilla 340
Second 2F13-244F4 Short 3196 km



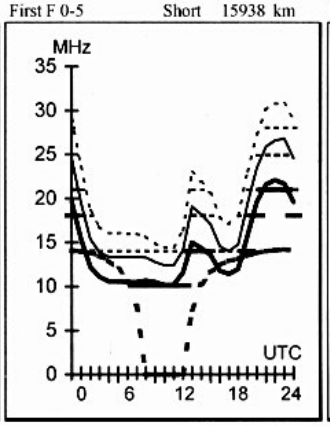
Adelaide-Tokyo 1
Second 3F4-9 3E0 Short 7855 km



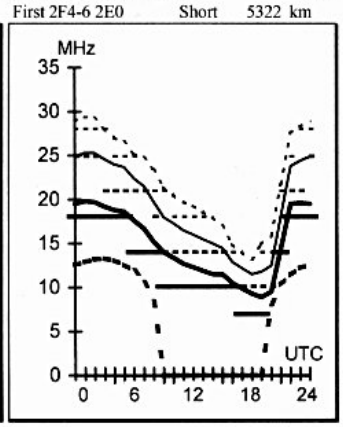
Brisbane-Singapore 293
Second 3F9-14 3E0 Short 6146 km



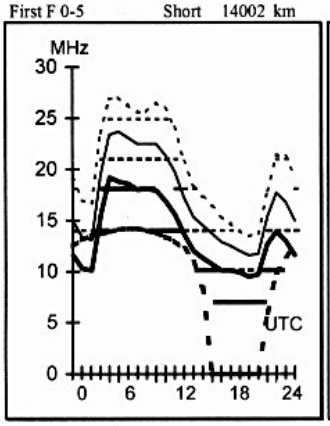
Canberra-Washington 70
First F 0-5 Short 15938 km



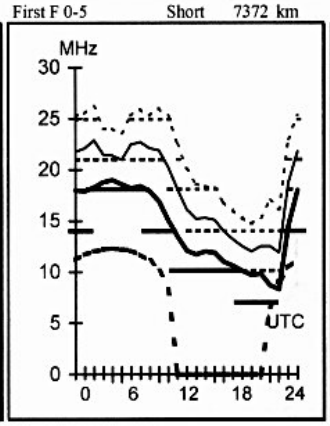
Darwin-Wellington 135
First 2F4-6 2E0 Short 5322 km



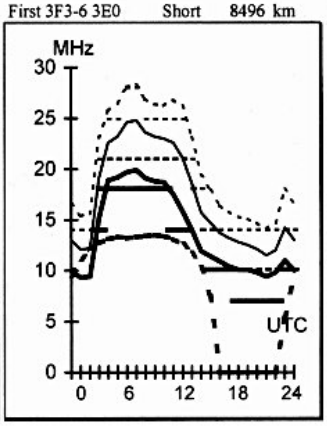
Hobart-Amman 283
First F 0-5 Short 14002 km



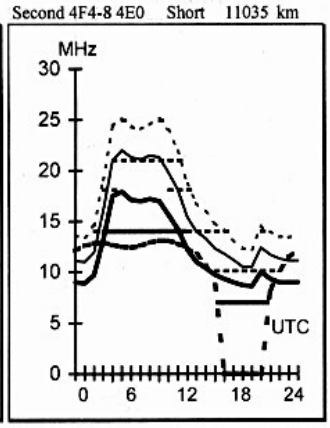
Melbourne-Bangkok 312
First F 0-5 Short 7372 km



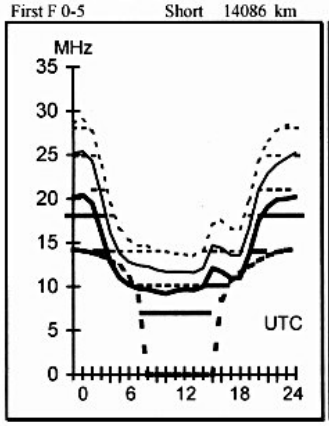
Perth-Harare 257
First 3F3-6 3E0 Short 8496 km



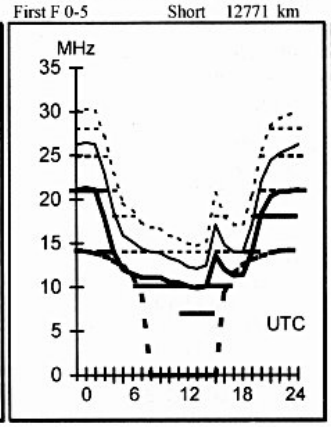
Sydney-Johannesburg 230
Second 4F4-8 4E0 Short 11035 km



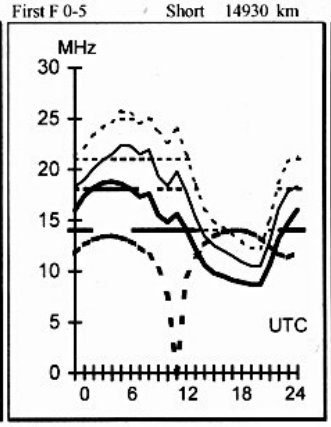
Hobart-Calgary 51
First F 0-5 Short 14086 km



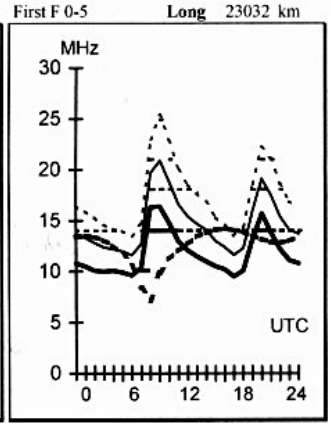
Melbourne-Los Angeles 65
First F 0-5 Short 12771 km



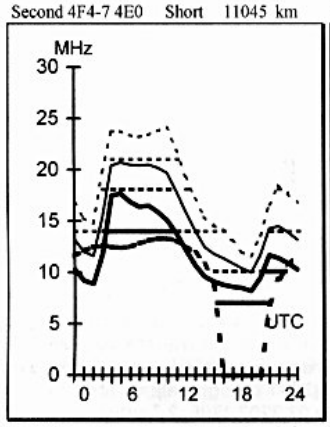
Perth-Lima 162
First F 0-5 Short 14930 km



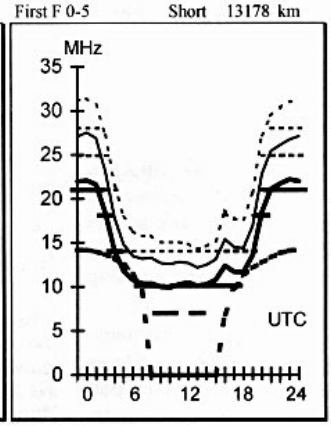
Sydney-London 139
First F 0-5 Long 23032 km



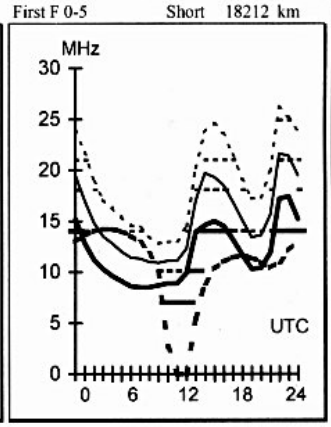
Hobart-Lusaka 239
Second 4F4-7 4E0 Short 11045 km



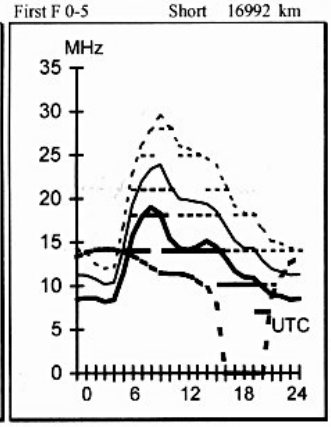
Melbourne-Seattle 50
First F 0-5 Short 13178 km



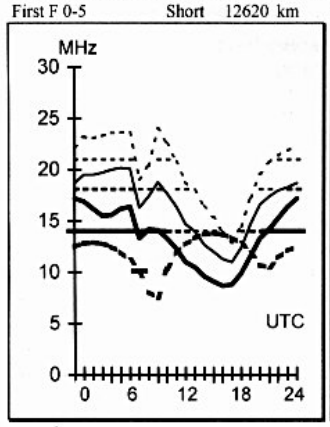
Perth-Ottawa 30
First F 0-5 Short 18212 km



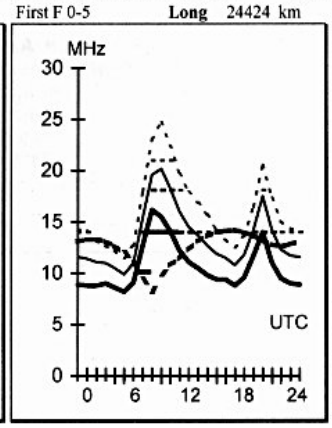
Sydney-London 319
First F 0-5 Short 16992 km



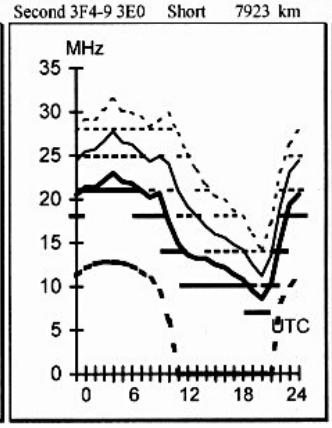
Hobart-Rio de Janeiro 169
First F 0-5 Short 12620 km



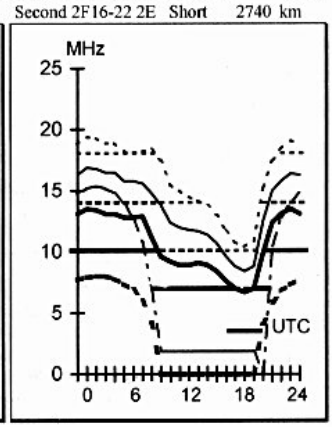
Melbourne-Stockholm 140
First F 0-5 Long 24424 km



Perth-Tokyo 20
Second 3F4-9 3E0 Short 7923 km



Sydney-Port Moresby 351
Second 2F16-22 2E Short 2740 km



Hamads *classifieds* FREE

FOR SALE ACT

• **Rotator, Kenpro KR-800S,** has approx 20 m cable $425. **Lower pipe clamps** $25. **Create thrust bearing** $50, or $450 the lot. **Light duty rotator** $65. John VK1CJ QTHR, Phone 02 6251 1816 or ronjon@wic.net.au.

• **Yaesu FRG-7** communications radio. Fitted with mechanical filter. Asking $125 ono. Purchaser to arrange freight. Bill Robertson VK1WPR Phone 0417 265 586

• **AOR AR-8200 MK3 wideband scanning receiver.** Brand new still in original shrink-wrap and packing, from deceased estate but out of warranty. Price is negotiable from $950. Contact Philip VK1PC, Phone 0414 475 953 or philipgc@iprimus.com.au

WANTED ACT

• **Eddystone** dial mechanism with 10:1 reduction, dimension 9 x 3, or similar. Also **Hewlett Packard HP-3406A** sampling probe. Peter VK1CPK. QTHR, Phone 02 6231 1790 Email: pkloppen@austarmetro.com.au

FOR SALE NSW

• **Yaesu FL-7000 500 watt Linear** $1,400.00 or near offer. Can be inspected at Andrews Communications Greystanes NSW. Phone:02 9636 9060. Adolph May, QTHR (Delete if no callsign) Phone: 07 4096 6961.

• **HP-7550 Plotter,** $90; **Panasonic KX-P1180 Printer,** $15; **2 x FM-828 A,** $40 ea; **2 x FM-92 A** plus 4 control heads, $100 total; **2 x MFJ-1270B TNCs,** one with 4800 baud modem, $10 ea; **1 x PacComm Tiny 2 TNC,** $10; 4 x **LDF4-50 female N connectors,** new; $20 ea; 8 metres **LDF5-50 coax,** $30; 6.5 metres **LDF 4-50 coax,** $20; Roger Woodward VK2DNX, Phone 02 9547 2546 or Rogerwoodward10@hotmail.com

• **QST and QEX**-10CDs 1996-2003 issues $250, **BIRD model 8133 coaxial resistor** $80, **Kenwood TS-870, Wilson System SY-1 4 element beam** $350. Tom VK2OE@ARRL.NET, 2/25 Andrew St Inverell NSW 2360, phone 0413 796 851, 8-9pm.

WANTED NSW

• **Controller for Channel Master rotator.** Must be in working condition and include wiring and cables. If not then wiring diagram schematics of controller if available would be appreciated. Contact c_irving@midcoast.com.au.

• **Yaesu transceivers wanted.** Prefer in good working order, will consider other condx FTDX-400, FTDX-401, FT-401B, FTDX-560, FTDX-570, linears FL-1000, FL-2000B, FLDX-2000, FL-2500, also speakers, VFOs, transverters to suit FTDX range. Mics Aiwa DM-47, DM-14 etc, Shure 444. Cash buyer. I have FT-920 in as new condx to swap for above gear to same value or will swap for good linear DX1, or anything of similar quality, try me. Mike VK2EFT Phone 02 6647 3271 or email rautem@dodo.com.au

FOR SALE VIC

• **FRG-7 Communications Rx** with manual $100. **IC-701 HF** XCVR (not working), trouble in output stage, plus desk mike **IC-SM5** for above with manual $100, or swap all of above for 13.8V 20A P/S. **Communications Rx IC-R71E** with manual, $200. Laurie VK3BV. Phone 03 5975 0306, email shirlau@dodo.com.au.

• **Eddystone receiver model 770R Mk2** VHF 19 MHz to 165 MHz $220. Len VK3AQJ, AH Phone 03 9762 3522.

• Deceased estate: **ICOM IC-751** HF transceiver with power supply $950. **MFJ-949E** de luxe Versa Tuner II $270. **Yaesu FRG-7** communications receiver $150. **Yaesu SP-102** speaker $120. Cables, manuals and circuit diagrams are available. Many other items are available also, please enquire. Carmel Phone 03 9325 4248.

• **Kenwood TS-930 HF** transceiver, excellent condition, $700. 100 watt, 160 m to 10 m, built-in antenna tuner. A very nice rig to operate; excellent sensitivity and selectivity, with slope-tune and notch filter; the variable band tuning and variable CW tone make CW reception a breeze. SSB transmit audio gets good reports and the RF speech processor is very effective. With Kenwood hand mic, operating and service manuals. Fred VK3AQN, Phone 03 9876 7997. Email fmnaylor@tpg.com.au

WANTED VIC

• **FT-7B, R-1155, B-40D, CR-100/B28 TKG.** Mr F Jackson, 38 Mooltan St, Flemington. Phone 03 9376 3076

• **Racal RA-17** receiver. If available will collect. Clem Smith VK3AYY. Phone 0417 574 456

• **Yaesu MH-14 A8 hand mic models** or similar. Phone Max VK3GMM on Phone 03 5985 2671

• **Barlow Wadley XCR-30** portable radio. Aerial variometer for No.19 set. Leads for 19 set, battery to psu, psu to set, set to junction, junction box, set carrier, junction box no.1. Roger VK3HRS Phone 03 9789 9580 email. emschem@techinfo.com.au

FOR SALE QLD

• **Yaesu FT-1000MP Mark 5** Transceiver Ser. No.IE270183. **Yaesu FP-29** Power Supply Ser. No.IE027. **Yaesu SP-8** External Speaker Ser. No.IF054. **Yaesu MD-100** Desktop Microphone Ser.No.IH52. **Yaesu MH-31** Hand Microphone. **Yaesu YH-77** Stereo Headphone. All equipment is less than 3 years old, in perfect and as new condition and comes complete with manuals and original strong shipping boxes. $4000 ex Tin Can Bay, Queensland. Price is non-negotiable. Ron VK4QM Phone 07-54880268 e-mail rhvette@gympie.big.net.au

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- Hamads may be submitted by **email** or on the **form on the reverse of your current Amateur Radio address flysheet.** Please print carefully and clearly, use upper AND lower case.
- Separate forms for For Sale and Wanted items. Please include name, address STD telephone number and WIA membership number if you do not use the flysheet.
- Deceased estates Hamads will be published in full, even if the ad is not fully radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from those who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising (Trade Hamads) are pre-payable at $25.00 for four lines (twenty words), plus $2.25 per line (or part thereof), Forty word maximum, minimum charge of $25.00. Cheques are to be made out to: WIA Hamads.
- Copy typed or printed clearly please, and received by the deadlines shown on page 1 of each issue of Amateur Radio.

Email: *newunltd@bigpond.net.au* **Fax:** *03 9756 7031*

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• **Yaesu FT-757** or **Codan 8525** or similar, working or not. Bruce VK5VK rfwizard@optusnet.com.au

MISCELLANEOUS

• **The WIA QSL Collection requires QSLs.** All types welcome, especially rare DX pictorial cards, special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765, tel. (03) 9728 5350

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The Wireless Institute of Australia represents the interests of all amateurs throughout Australia.

WIA membership fees are: ★ **$ 75 for full members (F grade),** ★ **$ 70 for pensioners and students (G and S grade), and** ★ **$ 50 for membership without 'Amateur Radio' (X grade).** ***Payment direct to National office.***

National Office	Contact	News Bulletin Schedule
10/229 Balaclava Road, Caulfield North VIC 3161, Australia	Phone 03 9528 5962, Fax 03 9523 8191, 10am to 4pm daily, nationaloffice@wia.org, www.wia.org	Subject to change see www.wia.org, follow national news prompts. Contact nationalnews@wia.org.au, National VK1WIA news is distributed to all states.

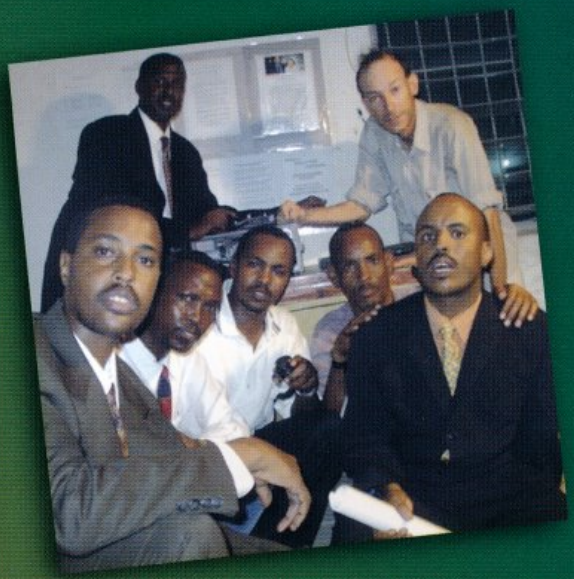
Advisory Committees	Contact	News Bulletin Schedule
VK1 Australian Capital Territory	secretary@vk1.wia.ampr.org	Sundays at 11.00 am VK1WIA 7.128, 146.950,438.050 Tuesday at 8.0pm 146.750, 147.375, 438.025
VK1WX Alan Hawse VK1ZPL Phil Longworth VK1ET John Woolner		
VK2 To be advised		
VK3 Victoria	Phone 03 9885 9261 advisory@wiavic.org.au	VK1WIA Sunday 11.0am via HF and major VHF / UHF rptrs
VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill		
VK4 Queensland	Phone 07 3221 9377 qac@wia.org.au	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rptrs
VK4ERM Ewan McLeod VK4ZZ Gavin Reibelt VK4KF Ken Fuller	ewan.mcleod@bigpond.com	
VK5 South Australia and Northern Territory	Phone 08 8294 2992	VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.
VK5NB Jim McLachlan VK5APR Peter Reichelt VK5ATQ Trevor Quick	jimac@picknowl.com.au peter.reichelt@bigpond.com vk5atq@chariot.net.au	
VK6 Western Australia	Phone 08 9351 8873 vk6council@iinet.net.au	VK1WIA Sunday 9.0am via WIA network
VK6NE Neil Penfold VK6XV Roy Watkins VK6KZ Wally Howse	vk6ne@upnaway.com vk6xv@bigpond.net.au vk6kz@bigpond.com	
VK7 Tasmania	Phone 03 6234 3553	VK1WIA via Tony, VK7AX 8.55am
VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	

Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.

Amateur radio helps a nation rebuild

Sam Voron VK2BVS/ 6OØA
Email: svoron@hotmail.com

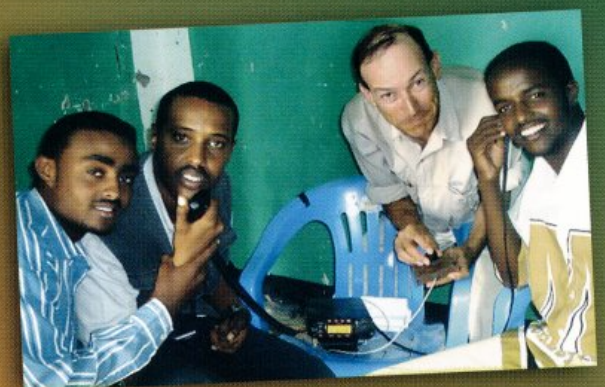


Radio Galkayo Amateur Radio Club at the Community radio station. Both its director 6OØXJ Hassan Mohamed Jamma and assistant director 6OØMY Mohamed Yasin Isak are amateurs from the 1993 ham radio course. The photo was taken on 18 August 2004 at the 11th anniversary party of Radio Galkayo in Somalia.

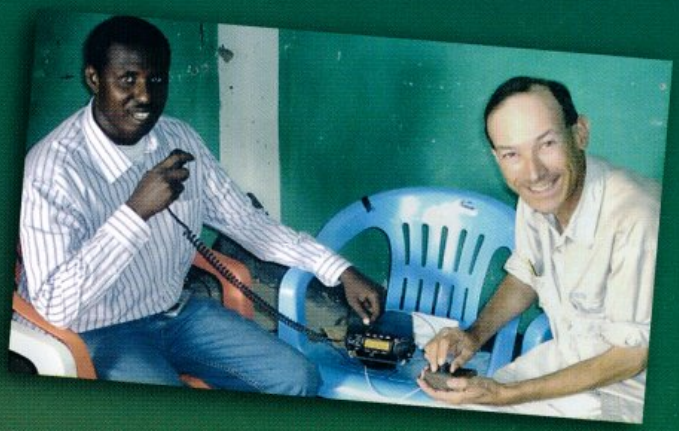
Amateur radio's unique ability to teach radio communications, electronics and volunteerism skills to anyone interested in gaining knowledge that can Help All Mankind and woMankind (Ham Radio) was especially helpful when the national Government of Somalia collapsed and communities had to look after themselves.

The first Somali students of the 1993 and 1994 amateur radio license qualifying course conducted by Sam Voron VK2BVS of Sydney, Australia have shown their ham spirit, using their knowledge to help the people in their distressed country and launching the only non political radio at that time called Radio Free Somalia, a community radio station free for all the people to use. That radio today is known as Radio Galkayo and operates on 6.980 MHz AM on short wave and 79.5 MHz FM.

The Radio Galkayo amateur radio club in Somalia



6OØA, 6O1A Sam Voron VK2BVS, Radio technician at Radio Galkayo and Radio Daljir using a home made Morse code key. Either side are the two technicians in training at Radio Daljir.key made from a reset button glued to a rubber foot and mounted on a plastic box.



6OØN Adan Nur Mohamud, Radio Daljir director holding the Microphone.

Local authorities honoured their promise over that 11-year period to keep the radio free, independent and community based. In return the International community have continued to provide the equipment to keep the short wave radio station on air.

In 1994 Amateur Radio Operator Bill Main VK6ZX working with Rotary in Boulder, Western Australia and Australian Government aid was able to upgrade the original equipment that was donated in 1993 by Sam VK2BVS.

Bill VK6ZX at Rotary and Sam VK2BVS has since donated equipment over the 11-year period to keep Radio Galkayo on the air.

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